

A
COMPLEAT BODY
OF
HUSBANDRY.

VOL. IV.

CONTAINING,

- I. The natural and artificial Products of the Farmer's Stock.
 - II. The making Beer and Cyder.
 - III. The Accidents to which the Cattle and the Crops are liable.
 - IV. The Diseases of Cattle, and their Remedies.
 - V. The Distemperatures of Trees, Roots, and Herbage, from the Injuries done by Insects, larger Animals, and Weeds.
 - VI. The poisonous and hurtful Plants, Natives of this Kingdom.
 - VII. Elevations and Plans of small Farm Houses.
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DUBLIN:

Printed for P. WILSON and J. EXSHAW in *Dame-street*.

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COMPLEAT BODY

HUSBANDRY.

VOL. IV.

CONTAINING

- I. The natural and artificial Production of the Horse's Stock.
- II. The feeding of Horses and Cattle.
- III. The Accidents to which the Cattle and the Crops are liable.
- IV. The Diseases of Cattle and their Remedies.
- V. The Disposition of Trees, Kents, and other parts, from the injuries done by insects, larger Animals, and Weeds.
- VI. The poisonous and useful Plants Native of this Kingdom.
- VII. Diseases and Plans of small Farm Houses.

DUBLIN.

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A COMPLEAT

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BOOK III.

Of the natural and artificial Products of the Farmer's Stock.

The INTRODUCTION.

WE have considered in a preceding Part of our Work, that important Article of stocking the Farm, and have acquainted our Husbandman with the several Breeds of those Animals which he is to feed upon its Produce for Labour or Profit.

We have supposed him provided, and have since gone through those several Articles by which he is to procure them Food, and in which he is to use their Service: this done, we come in the present Book, to treat of those Benefits he receives from them in their several Products, and the best Manner wherein he is able to use them to his Advantage.

We divide them into natural and artificial, as they are of two Kinds, properly coming under those two Denominations; one part of them arising naturally, and being used in the Condition in which he receives them; the other requiring Art and Management to bring them into the State that is fit for Sale.

Of the first Kind, or natural Products of the Stock, are

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Milk

Milk and Wool; these he receives from the Udder, or sheers from the Back; and he may sell them as they are, that is, in their natural State and Condition; of the artificial Kinds are several Things arising from the Use or Manufacturing of the former. Thus Butter and Cheese, though originally owing to Milk, yet are not obtained without manual Labour and Art. These we call the artificial Products of the Stock; and under the one or other of these Names, we comprehend the whole Produce from these Animals, according to the Manner in which it is obtained from them.

We shall treat of these several Subjects largely, though in as few Words as the Nature of what we have to say will permit. Many useful Things there are which the Farmer yet does not know relating to these Articles; nor shall we omit Matters of Curiosity relating to them, when they tend to explain and illustrate such as are of Use.

We apprehend that the Farmer of one Place may be instructed by seeing here the Practice of the Husbandman in another. There are many Things also written on these Matters, from which separating the useful from the ostentatious Part, much Knowledge may be drawn.

We propose therefore to lay before our Readers, so far as we have been able to collect or learn, the Substance of what some have written, and others have practised; and upon the whole to build a System for the Conduct and Management of these important Articles; which the Farmer's Reason shall countenance, and, we doubt not, his Experience afterwards approve.

CHAP. I. *Of Milk, and its natural Production.*

IN treating of Milk, the first Thing needful is to consider what it properly and truly is, for on that will be rationally founded all that is added concerning its Use.

Milk is a Fluid separated from the nutritious Juice of Bodies, called their Chyle; deposited by Nature in the Breasts or Udders of Female Animals, during their Pregnancy, and for the Nourishment of their Young.

After the Young is born it comes in greater Abundance: and it will be prepared and furnished by Nature in that plentiful Manner, so long as it is sucked by the Young, or any other Way drawn at Times; but when no Use is made of it, the Supply ceases, and the Milk, as the Expression is, dries up of itself.

We



We have mentioned the Breasts and Udders of pregnant Females as the natural Place for Milk ; but the Curious have discovered, and sometimes Accidents have shewn, that it is not limited to that Sex, or that State ; Male Creatures, both Human and of the Brute Kind, have had Milk ; and among the Females, such as have not been in a State of Pregnancy.

The Roman Charity so famous in History and Paintings, is an Instance of the latter in the Human Species ; wherein an old Man confined in a Dungeon, was supported with Nourishment by sucking the Breasts of his Daughter a Virgin.

As to the former Case, Accidents have from time to time rendered it notorious ; so long since as the Time of ARISTOTLE, it was known that some Men had been found to have Milk in their Breasts : and CARDAN upon his own Knowledge relates the same, averring that there was such a Quantity, that a Child might be nourished by it. PLINY relates the same of a Man in his Time, and ALDROVAND of another. These Authorities so numerous are not to be doubted ; nor is the Thing confined to the human Species in this Instance : we have a circumstantial Account in the Philosophical Transactions, of a Weather Sheep giving suck to a Lamb ; and that not wantonly or for once, but in a regular Quantity, and enough for the Support of the young Creature many Months.

Wonderful as all these Accounts may appear to those not used to consider Things in their Causes, there is not in Reality any Thing so strange in them, when the Matter is fully weighed.

Nature has provided Breasts and Udders, with their Teats and Nipples, for all Females, younger as well as grown up ; and to the Males she has given the same Parts, by way of Conformity in the Species, though not intended for the same Service.

Milk is a natural Juice, and although prepared regularly at a certain Period, yet being formed from the Nourishment of the Body, it may be produced at any other ; and as the Nourishment of Men is the same with that of Women, there is no Reason why it should not, if wanted, be supplied by one as well as the other.

We see in the common Course of Nature, that sucking will make it continue to flow when it otherwise would have dried up ; and there is not much more wonder that the same Force should bring it to a Place naturally destined for it, even at a Time when it would not otherwise have come.

This Method of reasoning, plain and familiar as it is, will
B 2 very

very well explain the Breasts of Virgins affording Milk on being sucked; and we shall not, upon a like rational Enquiry, find it any Thing more strange, that the same Force should bring it into the Breasts of the other Sex, whether in Human or Brute Creatures.

We see in Men the Texture of the Breasts is not very unlike that of Womens, and the Nipples are of the same Structure entirely. We have no Reason to suppose the Resemblance stops here. Indeed Anatomy shews that it does not, and therefore as the Parts are of the same Structure, and there is the same Nourishment for the Purpose, it is not strange that sucking should produce it.

The most plain Reader may understand these Reasonings; and so it is throughout all Nature, hard Words are only Cloaks for Ignorance. We believe it will from this appear, that far from discrediting the Stories they have heard or read of Milk in Virgins, and Milk in Male Creatures, our impartial Readers will join with us in Opinion, that the Wonder is rather that such Things are not more common.

It is not straining the Point too far to say, that probably any Virgin grown near Maturity, or any Man in Health, would give Milk if sucked some Time for it; and the same is doubtless equally true of Animals of other Kinds.

This seems to be a Provision of Nature, careful of all her Productions, as a last Resource, in case of extream Necessity, for the tender and defenceless Young of Animals, which from Accidents would otherwise be lost.

C H A P. II. *Of the Nature of Milk.*

MILK is very much of the Nature of what is called Chyle, that is, the nutritious Juice separated from our Food, and intended for the Support and Nourishment of our Bodies. All our Foods tend to the Formation of Chyle, and the great Purpose of Nature in their Digestion is the furnishing of a sufficient Supply of it; for on this, Restoration and Preservation of the Fabrick depend.

Chyle is a thin white Juice, consisting of the finest and most nourishing Part of our Food; and Milk is properly speaking, nothing more than a thicker and richer Chyle: when the two are compared together, there is found no other Difference between them; therefore we may very reasonably conclude, that Milk not only is made of Chyle, but that it is made by a very natural and easy Procedure; for there seems nothing
more

more to have been done than this, that a Quantity of Chyle has been brought into the Glands of the Breasts, and there some of its watery Parts have been separated from it; and the Remainder becoming richer by that Means, has been left there ready to be drawn by the Mouth of the Young, or otherwise, in the Form of what we call Milk.

It is not strange that Milk should be thus made by depriving a nourishing Juice of some of its watery Parts; for upon Examination by Glasses, we find that it still consists of only a small Part of real and rich Nourishment, mixed with a larger Quantity of a watery Fluid; and what we thus discover by Glasses, the Progress of Nature when Milk is left to itself to spoil, or when it is managed usefully in the Dairy also confirms; for whether Milk become unmixed, as we may say by the Course of Nature, or by Management for useful Purposes, still the same Thing is found; namely, a smaller Quantity of rich Matter, and a much larger of a watery Fluid.

When Milk is viewed with powerful Glasses, it does not look an uniform white Liquor, as it appears to the naked Eye, but is discovered to consist of two different Matters; the one white and rich which is kept separate in round Drops, and the other thin and watery: this last is the more large Quantity, and the other Drops swim in it.

In the same Manner when we make Butter and Cheese, we force a Separation of those Parts, which we could not see to be distinct and different in the Milk, though this common Operation shews they were so: the rich Part makes the Butter and Cheese, and the other runs off poor and watery in the Butter Milk and the Whey.

This is a Proof of the Truth of what Mr. LEWENHOECK first declared he saw by Glasses, and it is thus that the common Operations of our Lives illustrate the Truths of Philosophy; while Philosophy shews us the Principles on which they are founded, and will therefore be useful to improve them.

The old Physicians thought the Milk in the Breasts and Udders of Animals was formed from the Blood, but that led them into great Difficulties: Nature does not go to Work by such round-about Ways; the Process by which Milk was formed, might then well appear difficult to be comprehended; but upon the present Plan it is very easy. Milk is first of all conveyed to the Breasts in form of Chyle; that is, very nearly in its own proper Form; and as to the Change it undergoes in being separated from some of its watery Mixture, 'tis no more laborious, intricate, or difficult, than that of the Separation

of Urine through the Kidneys; nothing more is done than the throwing off a watery Part.

C H A P. III. *Of the several Kinds of Milk.*

THE Reader has seen that Milk is only a richer Kind of Chyle: he has been informed how it is prepared, and in general of its Nature: to come a little closer to that Point, we are to examine it farther.

We have seen that it is composed of more rich and solid, and more fluid and watery Parts; but although the Assistance of Glasses could inform us no farther concerning this Matter, the Operations of the Dairy do.

Philosophy shews us, from its Assistant Microscopes, only two Parts in Milk, but Experience discovers three.

Milk is found by the Operations of the Dairy, to consist of these three Parts; the Buttery, the Cheesy, and the Wheyey.

The Buttery Parts are those which being of an oily Texture, separate most easily, and get to the Top. This is found agreeable to all we know in Nature: we find Butter to be of the Nature of Oil, and we know Oil will swim upon Water. Therefore we find that these three separate Parts of which Milk is composed, are of three different Qualities; and by first understanding them, we shall easily comprehend all the Operations by which it is suited to our various Uses.

These three Parts are, 1. The oily; 2. The curdy; and, 3. The watery. The oily are, as we have seen, the Buttery Parts; the curdy are the Cheesy, and the watery are the Wheyey.

Nothing but the Force of Nature in the Body of the Animal, could work and blend these perfectly into one rich and nourishing Fluid, fit for the tender Stomach of the Young. We find they are so mixed there; and that they continue mixed in that Manner for some Time, after the Milk is out of the Body; but when they have once separated, either naturally or by Art, we shall never be able to mix them so again. Butter, Cheese, and Whey were all contained in the Milk, and Nature united them in that Manner; but all our Chymistry will never be able to mix Butter, Cheese, and Whey, into Milk again.

Thus far we have spoken of Milk in general, as Milk, not as the Milk of any particular Kind of Creature; but having shewn what the Fluid itself is, we shall now speak of its Differences according to the Creature from which it is obtained.

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We shall in this Place, remembering that we write for Use, not Curiosity, and for the Use of the Farmer in particular, avoid all those Things that might be said concerning the Milk of the Human Breast, and that of such other Creatures as do not fall under his Consideration.

We shall consider only the Milk of his Stock, as it may be profitable or serviceable to him in its several States, plain, or made into those artificial Products we have already named.

Milk differs extremely in various Creatures, according to their Diet, their Construction of Body, and the particular Structure of those Parts in which it is formed.

The first and great End of Nature in the Production of Milk, we have shewn was for the Nourishment of the Young; she knows, or to use more proper Words, God, whose immediate and regular Care in the Guidance of the World, is what we call Nature, knows best the Structure of those young and tender Bodies he forms; and he has accordingly provided in the Breasts and Udders of their Dams, a Nourishment suited to them.

Thus in all Creatures, Milk is, as we have shewn, the Chyle or nutritive Juice of the Parent's Body, formed into that Condition by the Separation of its watery Parts; but in some Creatures, more of those watery Parts are separated, and in others fewer, according to the Structure of those Vessels; and it must be according to what we see of their Food, that in some the Chyle comes more watery to those Glands that separate it, than it does in others: why otherwise should it be, that the Milk of the Cow should be so rich, and that of the Ass so poor, when both eat the Grass of the same Pasture.

Let not any be surprized at the calling Asses Milk poor in comparison of Cows, from an Opinion that it must be richer because of the Use Physicians make of it to restore decayed Constitutions: 'tis because it is poorer they prefer it, for the Stomach in those Persons is not able to bear the richer Milk of the Cow.

According therefore to what we see in Nature, it is plain that the different Construction of the Body, and different Fabrick of the Vessels formed for separating and preparing Milk, occasion that Liquor to be richer in some and poorer in others. This is all the real Difference between the Milk of one Creature and that of another: having premised this, we shall proceed to consider separately, those several Kinds that any Way come under the Farmer's Consideration.

These are principally four; the Cows, the Asses, the Goats, and the Sheep: a fifth might be added, for the Milk of the

of Urine through the Kidneys; nothing more is done than the throwing off a watery Part.

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We have seen that it is composed of more rich and solid, and more fluid and watery Parts; but although the Assistance of Glasses could inform us no farther concerning this Matter, the Operations of the Dairy do.

Philosophy shews us, from its Assistant Microscopes, only two Parts in Milk, but Experience discovers three.

Milk is found by the Operations of the Dairy, to consist of these three Parts; the Buttery, the Cheesy, and the Wheyey.

The Buttery Parts are those which being of an oily Texture, separate most easily, and get to the Top. This is found agreeable to all we know in Nature: we find Butter to be of the Nature of Oil, and we know Oil will swim upon Water. Therefore we find that these three separate Parts of which Milk is composed, are of three different Qualities; and by first understanding them, we shall easily comprehend all the Operations by which it is suited to our various Uses.

These three Parts are, 1. The oily; 2. The curdy; and, 3. The watery. The oily are, as we have seen, the Buttery Parts; the curdy are the Cheesy, and the watery are the Wheyey.

Nothing but the Force of Nature in the Body of the Animal, could work and blend these perfectly into one rich and nourishing Fluid, fit for the tender Stomach of the Young. We find they are so mixed there; and that they continue mixed in that Manner for some Time, after the Milk is out of the Body; but when they have once separated, either naturally or by Art, we shall never be able to mix them so again. Butter, Cheese, and Whey were all contained in the Milk, and Nature united them in that Manner; but all our Chymistry will never be able to mix Butter, Cheese, and Whey, into Milk again.

Thus far we have spoken of Milk in general, as Milk, not as the Milk of any particular Kind of Creature; but having shewn what the Fluid itself is, we shall now speak of its Differences according to the Creature from which it is obtained.

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We shall in this Place, remembering that we write for Use, not Curiosity, and for the Use of the Farmer in particular, avoid all those Things that might be said concerning the Milk of the Human Breast, and that of such other Creatures as do not fall under his Consideration.

We shall consider only the Milk of his Stock, as it may be profitable or serviceable to him in its several States, plain, or made into those artificial Products we have already named.

Milk differs extremely in various Creatures, according to their Diet, their Construction of Body, and the particular Structure of those Parts in which it is formed.

The first and great End of Nature in the Production of Milk, we have shewn was for the Nourishment of the Young; she knows, or to use more proper Words, God, whose immediate and regular Care in the Guidance of the World, is what we call Nature, knows best the Structure of those young and tender Bodies he forms; and he has accordingly provided in the Breasts and Udders of their Dams, a Nourishment suited to them.

Thus in all Creatures, Milk is, as we have shewn, the Chyle or nutritive Juice of the Parent's Body, formed into that Condition by the Separation of its watery Parts; but in some Creatures, more of those watery Parts are separated, and in others fewer, according to the Structure of those Vessels; and it must be according to what we see of their Food, that in some the Chyle comes more watery to those Glands that separate it, than it does in others: why otherwise should it be, that the Milk of the Cow should be so rich, and that of the Ass so poor, when both eat the Grass of the same Pasture.

Let not any be surprized at the calling Asses Milk poor in comparison of Cows, from an Opinion that it must be richer because of the Use Physicians make of it to restore decayed Constitutions: 'tis because it is poorer they prefer it, for the Stomach in those Persons is not able to bear the richer Milk of the Cow.

According therefore to what we see in Nature, it is plain that the different Construction of the Body, and different Fabrick of the Vessels formed for separating and preparing Milk, occasion that Liquor to be richer in some and poorer in others. This is all the real Difference between the Milk of one Creature and that of another: having premised this, we shall proceed to consider separately, those several Kinds that any Way come under the Farmer's Consideration.

These are principally four; the Cows, the Asses, the Goats, and the Sheep: a fifth might be added, for the Milk of the

Mare is used in some Places; but the first named Kind is the great and principal Concern of the Farmer, and the Support of the Dairy.

Nothing can be more rational than the giving such Milk as Asses, and any other Kind that can be borne upon the Stomach as a Restorative: For we have shewn already, that Milk is only Chyle under a particular Form, therefore when the Stomach will bear it, it is Nourishment ready formed, and fit for immediately mixing with the Blood, to answer all the Purposes of Life.

This is properly a Method of restoring Nature: it is coming in to her Assistance when she is not able to furnish Nourishment, by bringing her that of some other Animal ready formed, to supply the Place.

As to the Preference of Ass's Milk above that of the Cow, in the Relief of the Human Kind, the Reason is shewn in Nature, Let the Milk of our own Species be compared with that of a Cow, and that of an Ass; and the Ass's Milk will be found to resemble it much more than the other.

As it is commonly the Misfortune of Persons afflicted with such Disorders as require the Assistance of Milk, to have such sharp Juices on their Stomach, as turn it to Curd; the Remedy is to sweeten or take off the Sharpness of those Juices: Physicians prescribe various Things for that Purpose, but there is nothing equal to Chalk ground to a very fine Powder, and given in a little of the Milk.

These several Kinds of Milk, and their Value and Uses, so far as they concern the Farmer, we shall consider in their proper Order, beginning with that which many Times exceeds them all in Value.

C H A P. IV. *Of Cows Milk, and its general Differences.*

COWS Milk is in general by much the richest of all the Kinds we know, and the most profitable: its several Products in Butter and Cheese, being like its natural Condition as Milk, preferable to those of all others, not only in Quality, but in Quantity: two Articles which when they concur, as they do perfectly in this Instance, constitute the highest Use and Value to the Owner.

The Milk of the Cow is supposed to vary according to the Colour of the Skin, but this is an idle Observation. There is an old Saying among the Farmers, that red Cows give the best Milk; and another, that black Cows bring the finest Calves; but we can from fair Trial, and repeated Experience,

ence, assure our Reader, that there is not the least Truth in either of these Maxims: he is to look upon them as old Wives Tales, and no otherwise. We have seen as much and as good Milk from black Cows, as ever was produced from red; and we may call all SMITHFIELD to witness, that the Value of the Calf is not in the least dependent upon the Colour of the Cow.

We shall inform the Farmer what is the real Difference in Cattle that concerns their Milk, and he will see in the Course of that Enquiry, what has been the Origin of this idle Opinion.

He may remember that in a former Part of this Work, we have delivered him Rules for the Choice of his Cattle for their several Purposes; in this there is no particular Rule, for the Cow that will, when she is no longer fit for the Dairy, be best for the Butcher; will, for the same Reason, be best for the Service of the Dairy also, while of a proper Age.

Thus, in general, the Cow to be chosen for the Dairy should be large, big bon'd yet well shaped, and of the biggest Breed. This was always the Choice of the Cow, and this suits her as well for the Shambles as the Pail: when the Breeds of Cattle were kept more entire, WILTSHIRE was the Place from whence this large Kind principally came, and the Breed there was usually red: from hence it became usual to call the WILTSHIRE Breed, the red Breed; and thence instead of saying the WILTSHIRE Cow gave the best Milk, People used to say the red Cow gave the best; those two Words signifying at that Time the very same Thing.

An Error or Confusion of speaking exactly of the same Kind, gave Origin to the vulgar Notion of the black Cow bringing the best Calf. The LANCASHIRE Breed were famous for their Calves; and they were generally black: thus a black Cow, and a LANCASHIRE Cow, became two Expressions for the same Thing, in the same Manner, as we have shewn a red Cow, and a WILTSHIRE Cow meant the same; and thus it was that when they meant to say, the LANCASHIRE Cow was the best for a Calf, they named the Colour, and not the Place, and said a black Cow.

This has in each Case been the Occasion of a vulgar Error, and there is no more Truth at present in the Preference of the red Cow's Milk, than in any the idlest common Saying.

While the Breeds of Kine were kept distinct, there was some Meaning in it; though in Reference to the Colour, it

was only accidental; but now the Breeds are so mixed and confounded by introducing one among another, that nothing certain is to be deduced from the whole Matter.

There is another Article which does in Reality make an Alteration in the Milk of Cows, and that is the Pasturage, and Manner of feeding; but this we have, in general, considered already. The Reader will find it in our Discourse on the Cow Kind, to which we refer him to avoid Repetition.

C H A P. V. *Of the chusing a Milch Cow.*

WE have in the before mentioned Place, given at large the Marks of Cattle, which are best in their several Kinds; but in this Place we shall add for the Service of the Dairy, such Particulars as are of immediate Reference thereto, only mentioning in few Words so much of those general Directions as are needful to be remembered therewith.

Having fixed upon a Cow that is large and well shaped, let the Housewife examine whether she be gentle and kindly. This may seem trifling, but it is much otherwise. There are in these Creatures Differences of Disposition, as well as among ourselves, and it is in vain to think they can be altered; Perversenesses of this Kind are very difficultly conquered in us that have Reason, and it is not to be expected they can with Ease in such Brute Creatures as want it.

The Cow being a Creature that must be always about the House, her Gentleness is a very essential Point; and if she be of a very unruly Disposition, often it will reduce half her Value.

The principal Marks by which a Cow may be judged to be formed for Plenty of Milk, are a large and handsome Udder, with a proper Number of Teats, which is four, with no additional or ill shaped ones; but these four all long, thick, and small at the Ends.

After the Udder let the Neck be examined, this should be thin, and should have a large and hairy Dewlap.

The Horns are by many supposed to denote a large Quantity of Milk when they are short and crumpled, nor is this Mark to be utterly neglected. The Horns have no real Connection with the Udder, so that a Plenty of Milk does not depend upon them; but the best DUTCH and ALDERNEY Cows have these short and crumpled Horns, and they are superior to any other for the Service of the Dairy. The Horn being an essential Mark of the Breed in these, may therefore be considered as a Mark of Plenty of Milk.

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When several Cows are to be purchased for the Dairy, it is very material to have them all of the same Kind or Breed as nearly as may be; and to take Care the Bull or Bulls, according to the Number, be of the same Breed also.

We have before observed, that the Breeds are at this Time sadly mixed and confounded in ENGLAND; but as the Number cannot be had entirely of one particular Breed, let them be as near as possible of the same Make, Size, and Shape, according to the Rules we have laid down: and we must here repeat the Observation, that the Colour is of no Consequence: let not the Farmer trouble himself to have red Cows for serving the Dairy, and black Cows for calving: this will confound the Breed, the red will serve for both Purposes equally, if their Shape be proper, and so will the black; therefore let his whole Care be employed, as we have named already, to have them all good, and all like one another; by this Means they will herd the more kindly together, and he will have a Breed of his own better than what he at first purchased.

We have one Thing yet to mention, with respect to the Choice of a Cow for the Dairy, which is very often in the Housewife's Mouth, and should be always in her Mind in the Purchase. This is what they express by a particular Term, calling it Depth of Milk. By this they mean the Quantity the Cow does, or is like to furnish: and there are Ways of judging of this, without much Danger of Error.

The Time when a Cow gives the largest Quantity of Milk is, when she has newly calved, therefore let the Produce be well examined at that Time; for if it be deficient then, the Owner may be sure it will never be better.

There are Cows that have more, and others that have less Milk; or, according to their Expression, Cows that are deeper in Milk, and Cows that have less Depth of it, without any visible Reason for it; therefore in this, only Experience can guide.

We have given the Rule, and the Time of judging; and we shall proceed to advise the Owner to keep or dispose of his Cows accordingly: so that by Degrees he will thus exchange or sell, and purchase again, till he have at length not a Cow in his Yard but yields as much as a Cow well can.

This is an essential Point, for if the Difference in a single Cow be something, as it certainly is; 'tis very great in the Produce of a Number; and this is a Certainty that the Quantity of Milk does not depend upon the Quantity of Food,
though

though the Quality of it often does upon the Nature of the Food.

A Cow that is starved will not yield much, that stands to Reason; but if a Couple of Cows be watched, one of which is deep in Milk and the other not, she that is the least profitable, will be found to consume as much Provender, let it be of what Kind it will, as the other.

C H A P. VI. *Of the Quantity of Milk yielded by each Cow.*

THE Reader has just seen that there is a great deal of Difference in the Produce of Cows for the Dairy, when no particular Cause can be assigned; and there is also great Variation in respect of the Age, Time, Breed, and Size of the Cow, so that it is not only difficult but impossible to fix any Standard or Measure of the Quantity a Cow should, may, or ought to yield: yet that the Owner may form some guess whether his Dairy be supplied moderately, poorly, or very well, we shall give some general Calculations of what may be expected. This is all that can be done in such Cases; and this, though not capable of being brought to Exactness or Certainty, yet is of great Use.

Not only the Nature and particular Constitution of the Cow, will make a great deal of Difference in respect of the Quantity of Milk; but the Time of her calving, and the particular Circumstances relating thereto. These vary so much in different Cows, that they prevent the Certainty of that Rule which we have in general laid down for judging of the Depth of Milk, from the Quantity yielded just after calving; and these Particularities are to be weighed and considered: let not the Farmer therefore think the less of that Rule because there may be an Exception to it, from the particular Constitution of the Cow; but remember that all general Rules admit some Exceptions; and let him judge, both in respect of what has been said, and of what we are about to say accordingly.

Let him observe what Milk his Cow yields soon after calving, whether it be more or less, and mark her down accordingly; but though he set down that which yields a great deal at this Time for Keeping, and that which yields but little for Sale; yet let him continue both in his Yard through the Year, and examine them as they go on.

Often a Cow that gives a great deal at first, soon falls off in that Respect, and yields less than another; and there is this farther

farther Difference, that some go dry a Month, two Months, and some three Months, before they calve again, whereas others will yield their Quantity to the last. I have known them do it even the Night before their calving. This therefore is to be considered; for the same Cow that is deep in Milk once, will continue so; and in the same Manner, she that one Year gives little, will not be easily made to yield more another.

It often happens that one of those which yield a great Quantity when they have first calved, will grow dry ten Weeks or three Months before calving again; and on the other hand, that one which yields moderately at first, will continue it till the very Day of her next calving.

Now when a Cow yields but little at first, she can never be worth keeping for the Dairy, and therefore should be disposed of at once, and her Place in the Yard supplied by one more profitable; but a Cow that yields moderately, though not greatly, and continues it the Year round, may be worth more to her Owner than one of those that yield a great deal at first, and grow dry for several Weeks. This must be carefully regarded; for the Value or Preference of one of those Cows over the other, cannot be made without a Computation of the whole Produce for that Length of Time.

While this Observation gives the Farmer a Caution not to be too hasty in judging of the Value of his Cows, it at the same Time sets in a clearer Light the uncertainty and difficulty we have before named, of making any Computation strictly of the Quantity to be expected from a single Cow: we shall, however, speak as we proposed in general to that Point.

A great deal depends as to the Quantity of Milk upon the Time the Cow is to calve; and as this makes so great an Alteration in the annual Produce, we cannot state the Account without it.

The best and most favourable Time for the Cow to calve, in order to her yielding the greatest Plenty of Milk is, when the Pasturage is springing in all its Strength, for then it will make the greatest Supply. Therefore those who wish for Abundance of Milk, are very happy if their Calves fall in the End of MARCH, or the Beginning of APRIL, for at that Season the Grass is in its fullest springing Strength. The Calves at this Time indeed are not profitable for rearing, because they must be fed upon the Cows best Milk, which is not the case of those that fall later; but an early Cow, the
Calf

Calf being considered as to be sold to the Butcher as soon as may be, is vastly preferable in Point of the Abundance of Milk, to one that falls later.

To speak of the Milk in its most favourable Time for Quantity, and under the most favourable Circumstances, we will compute that of a new milch Cow first turned to Grass in APRIL. The Produce of such a Cow at such a Time, according to the different Accidents we have named, may be computed between five Quarts and twelve at a milking; and many of these Accidents have Causes so beyond our Reach to know, that it is often impossible to guess any thing about the Difference before hand. Three Gallons WINCHESTER Measure, at a Time, is a very great and rich Produce; two Gallons is a very fine Quantity: a Cow that gives five Quarts at a milking, which we have set at the lowest worth keeping, is a very good one, if she will continue it the whole Year round, so that she is worth trying; but the Cow that yields less than a Gallon is utterly to be rejected, and her Place supplied by another. In general, the Cow may be said to yield very well that gives a Gallon and a half at a Time, if there be a proper Continuance of that Quantity. If this be properly managed it will yield a sixth Part Cream, that is, one Quart of good rich Cream for every Time of milking each Cow; and this will yield very well a Pound of Butter.

This is the Computation the Farmer ought to receive as a Medium, he may rest satisfied with a Cow that gives less, and he may have one that yields much more, not a great deal to his Advantage; because those great Yielders, as we have observed before, do not hold out like those which begin, as the Expression is, fair and softly.

It will not be difficult, from this moderate Estimate, to compute what the industrious and careful Housewife will make of a good Number of Cows, the Produce is easy from one to many, when the common Quantity is known.

C H A P. VII. *Of the Times of milking.*

THE two great Points upon which the Profit of a Dairy depends are the Hours of milking, and the proper ordering of the Milk when it is brought into the House. The first may seem to many a small Concern in Comparison of the other, but those who have had Experience for their Guide know 'tis of great Importance.

A Cow should be milked always twice in the four and twenty

ty Hours: there are those who approve of three Times, but to speak from Experience I must have Leave to say; that it is Trouble employed to Loss; for upon Trial I have found that the Quantity of Milk obtained at twice milking at twelve Hours Distance, has been more than that got by three Times milking at six Hours Distance in the Day, and leaving the Night for Rest entirely.

This last Practice, however recommended by some who have written well on these Matters, and however approved by some who think themselves good Housewives, proves on Trial to be faulty and erroneous: 'tis only a teasing of Nature; 'tis expecting what cannot be performed, for a Supply worth taking, or needful to be taken, cannot be made in less than twelve Hours; and beside, Nature loves Regularity; and in our Way of two milkings in the four and twenty Hours, each may be at twelve Hours Distance: whereas in the other, the common Way is to have two Intervals of only six Hours each, and one of twelve.

Those who understand the Conduct of Nature in the Bodies of Animals, know that there is not this Difference to be made between the Hours of eating and of rest; for though the Creature eat only in the Day, the Work of Digestion goes on all Night, and therefore the Times of milking ought to be at regular Distances: this also is shewn by Experience, because we find a Cow with an Udder full in the Morning after sleeping, as well as in the Evening after the whole Day's feeding.

There are Cows that it is said require three Times milking in the four and twenty Hours, because otherwise they will shed their Milk: this would seem an Objection to what I have endeavoured to establish as a Rule; but from all that I have seen, this Necessity has been owing to nothing in regular Nature, but altogether to one of these two Causes, either to a Custom of doing it, or to some Distemper in the Udder, or in the Nature of the Milk.

Whatever Nature has been accustomed to, that she expects; therefore if a Cow have been used to be milked thrice a Day, she will require it, but the Quantity, as before observed, will not be at all more than if she were milked only twice; as to the other Case, of her shedding the Milk if not taken at these Times, it is to be considered as a Disorder, being certainly no other; and certainly what a sickly or distempered Creature requires, is not to be made a Rule for the Management of one that is in Health.

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From this, and from all I have seen, and all the Observations I have been able to make from repeated Trials, I am convinced that two milkings in a Day are as much as any Cow in a State of Health can require; and the greatest Quantity of Milk is obtained under this Management.

Having established twice in the four and twenty Hours, as the proper Periods of milking, the next Thing is to settle at what Time it shall be done. But this is a Thing more liable to Uncertainty than the other. In many Places there are certain stated Hours for the Sale of Milk, and when any considerable Quantity of it is intended to be disposed of in that Way, the Times of milking must be adapted to those Hours: thus in and about LONDON, and other large Towns, there are certain Hours at the which Families are used to take in the Milk for their Occasions, they therefore expect it at these Times; and the Retailers are used to have it at the Hours just before; so that the professed Cowkeeper, who intends this Use of his Milk, must accommodate the Times of milking accordingly.

On the other Hand, the Country Farmer who keeps his Dairy for his own Use and Profit, and sets the greatest Part, or in a Manner all that his Cows yield, for Cream, may take what Times of milking he pleases; and then it is his Business to chuse such as are most natural.

In Summer, when the Days are long, the most natural, convenient and advantageous Times are Morning and Evening: no Hours are so well as between six and seven in the Morning, and towards seven in the Evening. There are no Hours of the Day at which the Udders of the Cows are so naturally distended with Milk; consequently none at which it is so natural, or so much an Ease to themselves to milk them, or at which they yield so freely.

The Morning gives the Milk formed in the whole Night's Rest and Digestion; and the Evening gives that made from the abundant Food of the Day; Part of which, from the Quantity taken in, must be converted into Nourishment at the Time; the Remainder during the Hours of Repose. We have, in a preceding Chapter, informed the Farmer how Milk is formed and produced, therefore this Account will be familiar to him.

As the Days lengthen toward MIDSUMMER, these Hours may be made a little earlier and a little later, but not much; as the Days shorten after MIDSUMMER they must of Necessity be changed for such as are considerably later in the Morning, and considerably earlier in the Afternoon.

As to the third Time of milking, those over industrious
Persons

Persons who approve of it, generally make it six Hours after the Morning milking, which places it six Hours before the Evening Time in Summer, and makes it about the Middle of the Day. We have already shewn that it is prejudicial to the Creatures, and of no Advantage to the Farmer; and we may add, that as it requires more Trouble and Attendance of Servants, it necessarily brings on more Expence which is another Disadvantage.

From what I have seen of the milking Cows three Times a Day, I think I have Reason to imagine that it makes them dry up the sooner. I had been led to believe at one Time, that it would be a Way to keep them in Milk the Year round, and made Trials in my own Stock, carefully minuting Down the Observations, which I expected would have shewn this; but the Effect was exactly the contrary: so that seeing the Matter in all its possible Lights, this third milking is a disadvantageous Practice.

I have met with some Farmer's who have been strongly of Opinion, that the Cows keeping in Milk to the Time of their calving again, was not to their Advantage; for that the Milk being drawn away all that Time weakened the Calf. This is another of those specious Reasonings which nothing sets aside but Experience. I have examined and observed this Difference in respect of the Calves, not once or twice, but many repeated Times, and can assure the Farmer, from what I have thus seen, that a Cow's yielding Milk to the very Time of her coming again, is no Disadvantage at all to the Calf that is to come, but rather a Help. From these Observations what I have learned is this, that a Calf in the Body of the Cow is much more likely to have too much Nourishment than too little; and that for one which comes into the World poor and starved, twenty come full of gross Humours. At the same Time it is to be observed, that want of Nourishment is a Fault soon mended, for the Milk is rich and abundant, so that rarely any Harm happens from this; whereas the bringing into the World with them an Abundance of Humours and a Grossness of Habit, is commonly their Destruction.

Therefore it appears on all Hands, and from a Comparison of all Things together, that it is greatly to the Advantage of the Farmer, that his Cows should go the Year round with Milk, and consequently that it becomes his Interest to watch and observe them the whole Time; for that a Cow that yields but moderately, and continues it without any Interruption, is better for him in every Respect than one that yields an Abun-

dance at first, and grows dry afterwards. This is not the common Opinion, for that is on the contrary Side, but the Truth lies wholly here; and therefore the Experience is the more useful.

C H A P. VIII. *Of the Manner of milking.*

THIS may seem a Consideration too trivial to have a Place in such a Work as ours, but we shall not therefore neglect it: nothing is trivial that may prove of Consequence; and its to this single Vanity of over-looking Things of Importance, under the Name of frivolous and unworthy Consideration, that the greatest Part of the Writings on this Subject are wholly useless.

The Operation of milking indeed is very trivial and very easy; but as easy as it is 'tis not enough understood. It is entrusted to Persons who have little Sense or Consideration, and who learn it they don't know how; nor does the Owner ever concern himself whether they do it well or ill.

There is a great deal of Difference between handling the Teat gently and roughly; and some Knowledge is required to tell how the Milk shall be got with most Ease to the Creature.

Milking, when carefully performed, is an Ease and Pleasure to the Cow; but it may be so managed, and it too often is, that 'tis a Pain and Torment to her.

We have observed that there are Cows naturally ill-conditioned, but these are not common; the greater Part of the Accidents that happen in this Way, and are laid to the Fault of the Cow, are owing to the rough and ill Conduct of the Persons employed to milk her.

The Farmer also is not unfrequently distressed by the Disorders of the Cow's Teats, and the Hedgehog at this Time is blamed, as the Fairy used to be accused formerly of being the Occasion of those Disorders; but in general, the Urchin is as innocent as the Spirit; and the Disorders are owing to Hurts in the Handling of the Teats.

Having thus represented to the Farmer the Mischiefs that arise from an unskilful Way of milking, and the Necessity of its being performed in a better Manner; we hope he will not accuse us according to the vulgar Custom, of descending too low in the taking it under Consideration, nor neglect the practical Directions we shall give upon the Subject. His knowing what is proper to be done is the most important Consideration of all, for he will be able to say what is right and what

what wrong; to instruct the ignorant, and to over-look the opinionated: now and then giving an Eye to the Matter himself, and giving his Instructions where they are wanted, and Reproofs, where they are deserved, will set all right, and occasion his Business to be conducted in this Point much more to his Satisfaction and Interest than he could otherwise expect.

When the Milker goes to her Work she must take the near Side of the Cow, and begin by gently handling and stroaking down the Teats; and from time to time she must moisten them with Milk, to make them supple and pliable; and by this Practice they will be brought to answer to her Touch much better, and will yield the Milk more readily and freely, and that without any Pain to the Creature; indeed on the contrary with Pleasure.

There is palpably all this Difference in the Manner of milking. The Quantity in the Udder is a Burthen and great Weight to the Cow, and she wishes earnestly to be relieved from it; but if that be done with Harshness, so as to occasion more Pain for the Time than the Load of Milk, then she will avoid it: on the other hand, if she be milked kindly and gently, beginning as we have directed, not only the easing her of the Load is a Relief, but the very Manner of doing it is a Pleasure. Every Mother who has given Suck knows there is a Pleasure in performing that Office to the Infant, independent of any Thought of the Mind: this Pleasure is in the Nipple itself, and this the whole Creation of Female Creatures that give Suck have; and it is the same in milking as in sucking.

To this rude Method of handling the Teats is owing, as we have said, a great deal of the ill Disposition of some Cows; and to the kind and gentle Treatment others receive it is owing that they are kind and gentle themselves. A Cow that is well fed will have her Udder full at certain Times, and when she knows she can be relieved from that Load without Pain, she will come of herself to the Pail, and will stand with all possible Satisfaction.

We have said in what Manner the Milkmaid is to begin her Work, and shall add how she is to continue. She must not fix herself, nor set her Pail firm to the Ground, till she has got the Cow to stand sure and quiet: these Creatures are often very restless in the Beginning, but they will stand still enough when the Milk has come for a little while freely. This must be watched, because the Milk that is got will be other-

dance at first, and grows dry afterwards. This is not the common Opinion, for that is on the contrary Side, but the Truth lies wholly here; and therefore the Experience is the more useful.

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The Operation of milking indeed is very trivial and very easy; but as easy as it is 'tis not enough understood. It is entrusted to Persons who have little Sense or Consideration, and who learn it they don't know how; nor does the Owner ever concern himself whether they do it well or ill.

There is a great deal of Difference between handling the Teat gently and roughly; and some Knowledge is required to tell how the Milk shall be got with most Ease to the Creature.

Milking, when carefully performed, is an Ease and Pleasure to the Cow; but it may be so managed, and it too often is, that 'tis a Pain and Torment to her.

We have observed that there are Cows naturally ill-conditioned, but these are not common; the greater Part of the Accidents that happen in this Way, and are laid to the Fault of the Cow, are owing to the rough and ill Conduct of the Persons employed to milk her.

The Farmer also is not unfrequently distressed by the Disorders of the Cow's Teats, and the Hedgehog at this Time is blamed, as the Fairy used to be accused formerly of being the Occasion of those Disorders; but in general, the Urchin is as innocent as the Spirit; and the Disorders are owing to Hurts in the Handling of the Teats.

Having thus represented to the Farmer the Mischiefs that arise from an unskilful Way of milking, and the Necessity of its being performed in a better Manner; we hope he will not accuse us according to the vulgar Custom, of descending too low in the taking it under Consideration, nor neglect the practical Directions we shall give upon the Subject. His knowing what is proper to be done is the most important Consideration of all, for he will be able to say what is right and what

what wrong; to instruct the ignorant, and to over-look the opinionated: now and then giving an Eye to the Matter himself, and giving his Instructions where they are wanted, and Reproofs, where they are deserved, will set all right, and occasion his Business to be conducted in this Point much more to his Satisfaction and Interest than he could otherwise expect.

When the Milker goes to her Work she must take the near Side of the Cow, and begin by gently handling and stroaking down the Teats; and from time to time she must moisten them with Milk, to make them supple and pliable; and by this Practice they will be brought to answer to her Touch much better, and will yield the Milk more readily and freely, and that without any Pain to the Creature; indeed on the contrary with Pleasure.

There is palpably all this Difference in the Manner of milking. The Quantity in the Udder is a Burthen and great Weight to the Cow, and she wishes earnestly to be relieved from it; but if that be done with Harshness, so as to occasion more Pain for the Time than the Load of Milk, then she will avoid it: on the other hand, if she be milked kindly and gently, beginning as we have directed, not only the easing her of the Load is a Relief, but the very Manner of doing it is a Pleasure. Every Mother who has given Suck knows there is a Pleasure in performing that Office to the Infant, independent of any Thought of the Mind: this Pleasure is in the Nipple itself, and this the whole Creation of Female Creatures that give Suck have; and it is the same in milking as in sucking.

To this rude Method of handling the Teats is owing, as we have said, a great deal of the ill Disposition of some Cows; and to the kind and gentle Treatment others receive it is owing that they are kind and gentle themselves. A Cow that is well fed will have her Udder full at certain Times, and when she knows she can be relieved from that Load without Pain, she will come of herself to the Pail, and will stand with all possible Satisfaction.

We have said in what Manner the Milkmaid is to begin her Work, and shall add how she is to continue. She must not fix herself, nor set her Pail firm to the Ground, till she has got the Cow to stand sure and quiet: these Creatures are often very restless in the Beginning, but they will stand still enough when the Milk has come for a little while freely. This must be watched, because the Milk that is got will be other-

wife in Danger. The Cow is a heavy Creature, and a little Kick of her Foot will bring the Pail down.

When she is once settled, and the Milkmaid is seated, and all goes on for some Minutes right, there is less Danger, but still the Woman must be always upon her Guard, a Cow may start at any Time, and she must have her Eye upon all her Motions, and her Hand upon the Pail, ready to remove it upon Occasion, otherwise the overturning of a Pail is very easy, and the Milk may be all lost in a Moment, that this careful Eye might have saved.

When the Cow is quiet and seems pleased with the milking, then let the Woman go on boldly; that which would have pained the Creature cruelly at first, will not hurt her at all now, that the Teats have been handled, moistened, and rendered supple; let her therefore now pull and strain them freely, and draw as long as any Milk will come.

This last Article must be treated of more largely than in those few Words. The worst Fault a Milker can be guilty of is, the not doing it clean and thoroughly. Let the Farmer or his Wife frequently see to this: they should give all their Milkers Orders to take Care, that not a Drop of Milk be left in the Udder when they leave off; and they should see at Times, when they are at their Work, whether those Directions are punctually followed. If there were nothing but the Loss of so much Milk as is left in the Udder that is but half drawn, that would be some Consideration, for in a Number of Cows it would amount to what was considerable, and this twice a Day would, in the Year's Course, make a great Diminution in the Profits of the Dairy: perhaps this alone would make the Difference of four or five Cows in a Year, and the Farmer knows the Value of their keeping well enough, to be sensible what a Fault that would be. But there is a much greater Consideration than this, for there is nothing that tends to keep a Cow so full in Milk, as the constantly milking her quite clean; and on the other Hand, there is no Way so sure to make her soon dry, as the milking in a careless Manner, and always leaving some behind in the Udder.

This depends upon the Course of Nature in furnishing the Udder with Milk, as we have shewn. While it is drained Nature gives a continual and constant Supply, whether that draining be done by the Mouth of the Young or the Hand of the Milkmaid; but as soon as no more is drawn no more is provided. This is the Case at large when the Young dies, or the Creature is any way left untouched; and the same
Thing

Thing holds good, in a proportioned Degree, when she is carelessly milked, and the Udder not well drained.

When that is perfectly emptied at Times, Nature goes on vigorously with a Supply; but when it is done but imperfectly she performs her Work languidly, and there is not that free and full Supply any longer. The Farmer knows the Importance of keeping his Cows deep in Milk, and a long Time in it; and it is fit he should perfectly know, and thoroughly consider how much that important Article depends upon the Milkmaid's doing her Duty.

Another Caution to be given to all Milkers is, that they make themselves as familiar and friendly with the Cows as possible. By Gentleness and kind Treatment they will come to know them, and will go to the Pail like rational Creatures. While they are milking, common Discretion will teach the Person not to do any thing to startle or frighten them; and it is a good Caution also to let them go quietly and easily away. I have seen many drive their Cows away hastily and roughly, as soon as they had done, as if they never were to have any thing to do with them again. All Creatures have Memory: the Cow does not forget this; and it is that makes her shy or troublesome the next Time: let them always be treated tenderly, and let them go peaceably as they come: there is no other Way to have them come peaceably again.

C H A P. IX. *Of ordering the Milk in the Dairy.*

THE Farmer has seen every Article necessary to be done in the obtaining his Milk from the Cow, let him now take Care of it when he has got it: he has taken the proper Measures for having the best Cows; for getting the most from them; for keeping them long to it; and for avoiding Mischiefs in the drawing it; we will suppose it therefore in the Pails, and bringing Home; and that he is desirous to make the Dairy fit to receive it in the best Manner.

The first Thing, and the most important of all in a Dairy, is Cleanliness. Not only all the Vessels and Utensils, but the very Floor, Walls, and Cieling; every thing that is in it, and every thing that is about it, must be thus managed with the utmost Nicety of Cleanness, or there will be continual Damage and Loss.

The great Article in a Dairy is to keep all sweet; and there is no Way to keep Things sweet like keeping them perfectly clean: this Reason dictates, and this Experience confirms.

The Dread that should always be uppermost in a Dairy is

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of Sourness: and to keep Things from souring the Receipt is the same; that is, keep them clean.

Milk will at the best keep but a little while. All the Art and all the Care in the World cannot keep it long: it will become sour, and there is the great Damage. When it has once got sour it will spread the Mischief, and this is what the Mistress of the Dairy is to employ all her Care to prevent; and the far greatest Part of that Care centers in the same Point Cleanliness.

The Foulness of a Dairy is usually from corrupted Milk or Cream, and this must be cleaned away perfectly, for it will otherwise not only communicate itself to whatever is near it, but will infect the very Air of the Room, to the Prejudice of the whole Quantity of Milk that is brought into it, and of every thing that is going forwards. What the old Wives used to attribute to Witches and Fairies, was in reality the Effect of something sour left in the Dairy: this was the natural and real Cause, but the Effects of it are so great and so perplexing, to such as do not know the Cause, that no Wonder they thought Witchcraft had a Hand in it.

Here then lies the first Article of Cleanliness, which is to take Care no spoiled Remains of a former Business hang about the Dairy, nothing sour remain in any Crack or Crevice; for this End all the Pails, Pans, and Vessels, must be daily perfectly cleaned; and for this Reason glazed Earthen Ware is preferable to any other Materials for them, because nothing sticks to it; there are no Crevices in it, and one may always see whether it be clean.

Those who are at all acquainted with the Business of a Dairy, know how nice and ticklish all the Works of it are; therefore let them take Care not to add to the Hazard or Perplexity by Foulness. We have mentioned the Remains of any thing sour as the first Article, because that is a Mischief that spreads so quick and so far, but we are also to caution the Housewife against Grease, Dirt, or Filth of any Kind whatsoever; for every thing that does not belong to the Work of the Dairy hinders it.

There is no Way to clean and sweeten the Vessels, but by scalding them with boiling Water, and then setting them out in the Air: the first cleanses off all Filth that is visible to the Eye, and the latter removes any Taint by purifying and evaporating any thing that remained about them. There is nothing equal to the Sun, Wind, and Air, for purifying Things after proper cleaning, and this Practice should be used in the Dairy every Day, whether the Things appear dirty or no; there

there may be Filth about them that is not seen, and the least of it will do Mischief.

C H A P. X. *Of the Vessels of the Dairy.*

THE Use of the Dairy is to produce from the natural Milk, such Products as the Farmer shall find turn best to his Account; and the several Vessels employed in it all tend to that Purpose. These we are to consider in two Lights, with respect to their Form and their Materials.

As to their Form we are not ignorant of the many new Inventions that have been started for the facilitating the Operations of the Dairy; nor do we utterly advise the Farmer from regarding them; but this Caution we shall give him, that he do not rely too much upon the Words of their Inventors, or of those who have so warmly recommended them. These have been in general People of Ingenuity, but of no Experience. They have seen the Conveniences that might attend something of the Nature of what they proposed, but they have not perceived what might be the Inconveniences of their own particular Inventions, therefore the Farmer, or practical Dairyman, is to try before he approves: he is obliged to those Gentlemen for the Hint, but he is to determine for himself, for he can do it much better than they, whether that Hint can be reduced to Practice.

Thus it is the reasonable Husbandman will consider all that is offered for the Improvement of his Profession, neither rejecting at Random, nor adopting without Proof. Many Things appear very feasible in the Closet, that are utterly impracticable in the Field: there is therefore no other Way of judging of them than by the Help of that Experience first, which their ingenious Inventors wanted; and afterwards, if this Experience joins in the Opinion, then to bring them to a Trial.

'Tis thus we advise the Farmer to consider the several new Improvements of a Dairy; and having given him this Hint, or if we may use the Expression, this Rule of Practice with Respect to the new, we shall proceed to inform him in the Management of the old and accustomed Methods: these are sure, and to confess a Truth, disagreeable perhaps to the Inventors of new Schemes on this Head, I have never yet found upon Trial, that any others, with all their specious Promises, exceeded them.

As to the Materials, of which the Vessels for the Dairy should be made, we have already declared for glazed Earthen

Ware; but that not so absolutely as to reject those of all other Kinds.

People of Fortune who have amused themselves with the Pleasures of a Dairy in the Country, have covered their Walls with Dutch Tiles, and had their Vessels of China, and this is extremely right. As to the Vessels, China are in this Respect as good for Use as glazed Earthen Ware, but not in the least better, for they are covered in the same Manner with a Glazing; and so a Vessel be glazed, and the Glazing whole and without Flaws, 'tis no Matter whether it were done in the EAST INDIES or at Home. There is a Difference in the Materials used in the Manufactures of EUROPE and the East on this Occasion, but it is not material in this Consideration. Our Glazing for these Vessels is made of Lead, and theirs is only a Kind of Earth mixed up in Water, but the Effect is the same. Either is a glassy or shelly Substance which the Milk cannot penetrate, and therefore they equally answer the Purpose.

As to the covering the Walls with Tiles it is certainly right, as it answers two Purposes, both very essential to a Dairy, Cleanliness and Coolness. I have seen a Dairy in WILTSHIRE lined throughout with Lead, and it had also a very good Effect. The Expence of this last Method will appear considerable at first, but taking in the whole Account nothing is so cheap. It lasts from Generation to Generation without Repairs, and it has always a very considerable intrinsic Value: so much Lead is worth so much Money at any Time.

The usual Kinds of Vessels are three, Earthen Ware glazed, Wood naked, or Wood lined with Lead. As to the first we have spoken, the second is very good, but it has less natural Coolness, and is not so easily made perfectly clean as the Earthen Ware; the Lead has all the Advantage of Coolness, and may easily enough be kept clean.

The Difference is not very great, but the Reason will easily be seen in what we have here said, why we give the Preference to the Earthen Vessel.

Where the Dairy lies low, and is in itself very cool, Wooden Vessels do better than elsewhere; and where there is a very great Business carried on, there is Convenience in Wood lined with Lead, because Vessels may thus be made of such a Form and Bigness, as cannot be had from the Potteries. On all Occasions the Shape of the Vessels should be broad and shallow: this answers two Purposes, for it makes the Milk yield the largest Quantity of Cream, and it keeps it the longest

longest from souring. It is a Rule founded upon repeated Experiments, that a Quantity of Milk under the same Circumstances otherwise, will always sower the sooner, the deeper it lies together in the Vessel. Upon these Principles, founded on Experience, not on any fanciful Theory, stands the whole Matter of the preparing a Dairy for the Reception of the Milk.

C H A P. XI. *Of setting the Milk for Cream.*

THE Dairy is now ready for the Milk, and that is coming Home in Pails upon the Shoulders of the Milkers, the Vessels in which it is to be set are placed ready to receive it; but there is one thing to be considered previously to its being put into them.

We have taken Care that there be no Dirt in the Dairy, let us take the same Precaution that none come into it from the Field. Too much Cleanliness can never be recommended to the Milkmaids, but let them take what Care they will, they can never keep their Pails perfectly free from Dirt, or some accidental Foulnesses. The Hairs from the Cow will fall into them, and other little Matters of the same Kind may also. Now all these, however they are blended among the Milk, would rise with the Cream, and so not only disgrace the Housewife, but disturb all the Operations that are to follow; for we have shewn that any the least Filth will perplex and teaze the whole Management afterwards.

To prevent Accidents of this Kind the Milk is to be strained; and this is to be done in a very easy and familiar Manner, by Means of what the Housewife calls her Soiling Dish, or as they commonly speak it the Syle Dish. This is a wooden Bowl, with its Bottom cut out, and the Opening covered with a Piece of fine clean Linen Cloth.

This Bowl must be every Day scalded, and set out in the Air to sweeten like the rest, and Care must be taken that the Cloth be always perfectly clean. Through this Dish the Milk is to run into the several Vessels prepared to receive it, and then it will run perfectly clean and pure, for the hollow'd Bottom will stop the smallest Particle, and thus nothing but the Milk can get into the Vessels.

Thus far then we will suppose our Housewife has provided with perfect Care and Regularity, her Milk is perfectly pure, and is in the Vessels perfectly clean: there is therefore no Danger of any Injury to it, and 'tis now to be left to Nature. The Dairy is cool, clean, and quiet, this is all that is needful,

needful, or can be done to promote the gathering of the Cream: properly speaking nothing can be done to promote this, for it is a natural Procedure, and must go on in its own Way, all that can be done is to prevent Dirt, Heat, or Disturbance; and this we have contrived already to do in the Structure of the Place.

The Milk, as we have shewn, is composed of different Parts: these are kept mixed while it is in the Body of the Animal, but they separate one from another when they are out: this is that Separation which prepares for the Operations of the Dairy. The rich and fatty Part separates from the poor and watery; that is, the Cream rises to the Top, and leaves the thin and watery Part at Bottom. The broader and shallower the Vessel is in which it is set, the more freely, easily, and readily this Separation is made; that is, the sooner the Cream gets to the Top, and the greater Quantity there will be of it; these are the two great Points the Housewife desires, therefore she will always use such Vessels.

C H A P. XII. *Of skimming the Cream.*

WE are sensible how lightly many of these Things are in general looked upon, that here make the Subjects of so many distinct Chapters, but it is to that want of Consideration of what are called Trifles, that half the Disappointments and Losses in a Dairy happen. It may easily be said, that every Housewife knows when her Cream is risen she is to skim it off: that is true, we do not take up her Time in telling her that she is to do it, but we are about to acquaint her how she shall do it to the greatest Advantage; and from what we have seen of Dairies in some Parts of this Kingdom, no Part of Information relating to the whole Farm is more necessary.

We have recommended Cleanliness in every Article relating to the Dairy, but here we are to repeat that Lesson. There is nothing that requires more Nicety than the skimming off the Cream, nor any Article in which a little Dirt can do so much Damage.

We will suppose the Milk to have been brought in in the Morning, according to our Directions for the Summer milking, about Seven o'Clock; toward Afternoon let the Skimming Dish be cleaned and got ready, and the Vessels that are to receive the Cream. The Skimming Dish should be of a convenient Size for the Hand, not too deep, and thin at the Edges.

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The Time that Milk should stand is a Point in which few are agreed, and about which most err. I shall endeavour to set the Matter in as certain a Light as its Nature will bear: perfect Punctuality cannot be expected in any Rule on such a Subject, but being in one Article established, the Housewife may vary according to her Discretion, as the Circumstances vary: and it is better to have a Rule fixed for one Season and Kind of Weather, than to have none fixed at all.

In Summer then I shall say ten Hours are in general enough for Milk to stand. Therefore this Milk having been brought in at Seven in the Morning, will be ready to skim at Five in the Afternoon; and this will be a very convenient Time to the Housewife, because what she is now doing will prepare for the Evening Milking.

Many let their Milk stand longer than this in Summer, and consequently vary according to the Circumstances at other Times; but by what I have found from repeated Experience, there is no Rule so proper. 'Tis a very nice Point, and of very great Importance, either Way an Excess or Defect may be of great Damage; if the Milk be skimmed too soon the Housewife has not her full Quantity; and if it stand too long the Butter made with it will suffer.

The first of these Points is plain to every one, but the latter is not sufficiently known; or at least not enough regarded. When Milk stands too long without skimming, the Cream gets a thick Head, and is untractable, and the Butter that is made of this is always bitter. I have known this in Instances out of Number, and when I have convinced some Housewives that it was owing to this Fault of letting the Milk stand too long, they have tried every Method that could be thought of to prevent the Effect, but in vain: I have known them boil the Cream that was thus taken from Milk which had stood too long, in order to prevent this ill Taste in the Butter, but to no Purpose; it has still been as bitter as if nothing were done to prevent it.

What all the Pains and Care imaginable cannot remedy in this, as in many other Cases, may easily be obviated, and that is the Lesson which we give to the Housewife. Prevent the Damage by skimming in Time.

We have given this Instance of the bad Effect of letting Milk stand too long, nor is it the only one by many, but it is so plain, and a thing so easily in every one's Power to try, that it is, we hope, sufficient. Therefore, according to our Rule, let the Milk be all skimmed at Five o'Clock in the Afternoon,
and

and let it be put into a proper Vessel. The best Vessel is an Earthen Pot well leaded, with a Cover. When it is put into this, let it be set by in a close cool Place.

The Cream is now taken off, put into the Pot, and set by, an Hour or more has been employed in this, and in cleaning the necessary Vessels, and by that Time they are got in and set in order 'tis Seven o'Clock, and the Milkmaids come in loaded from the Evening's Milking. The Milk is to be strained and managed exactly in the same Manner as the first, so there needs no particular Direction on that Head; and we shall therefore, to avoid Repetition, suppose the same Business gone through, and the Milk all set as the first.

The Housewife may now be quiet for the Night, but let her take Care to be up early in the Morning. The next Article to Cleanliness is early rising in this Business, and it is need she be up, for the Milk she has set over Night will be ready for skimming after ten Hours, or half an Hour more, that is, by Five, or soon after Five in the Morning. In general it will be best to allow half an Hour longer standing during the Night than in the Day, because the Night is cooler; and Experience shews that the Warmth of the Air has a great deal of Effect in the throwing up of Cream.

In this Manner the Cream will be taken off from the Evening's Milk; and all got ready for the Reception of that of the Morning, by that Time the Milkmaids come Home with it; and thus the whole Round of that important Article, the obtaining, setting, and skimming the Milk, will be managed without the least Trouble or Perplexity, and every thing go on in a quiet and regular Order.

C H A P. XIII. *Of the Management of the Cream.*

IN the Close of our last Chapter we left our Housewife with her Pots of Cream, and her Dairy Work going on with due Regularity, we must proceed to advise her how to manage the Produce of her Pans in the best and most satisfactory Manner.

In this Article there is Need of the greatest Caution, and that for the plainest Reason in the World, which is, that Convenience would naturally prescribe the keeping it longer than it is found in Effect safe or proper to do.

The Weather makes a great Variation in this Article, and we are to observe also, that there are artificial Ways of assisting Nature in preserving it. However, as pure sweet Cream,
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in its natural Condition, is vastly preferable to the best that is preserved in whatever Manner by Art, we shall first give the Housewife her Lesson how long she should, and how long she may keep it naturally; and afterwards inform her what may be done in the keeping it longer, by Art and Management.

The finest and most excellent Butter is that which is made from Cream that has not stood above ten Hours in the Summer; on the other Hand, in Winter it may be kept much longer without Damage. When we name the Time of ten Hours, it is by Way of limiting the Space in which it is quite perfect; for Butter that is made from Cream ten Hours old, or from such as is just skimmed is altogether the same. After this in Summer it begins to find some Change, but it is little for the two succeeding Days, only in general the newer the better.

The Season makes so great a Variation in this Matter, that Cream may be kept very well twice as long in Winter as in Summer.

In Summer it may be kept without any material Disadvantage two Days and a half; and in Winter it may be kept in the same Condition five Days.

The Housewife who intends to have Credit in her Butter, if she takes Care not let the Milk stand too long before it is skimmed, may very well keep it thus long without any particular Management; but if she intends to have more of it together than can be got from her Stock of Cows in that Time, or to churn but at certain Times, which require the Cream to be kept longer, then she must use some Art to preserve it.

In this Place however it may be necessary to observe, that in making Butter for Sale in large Quantities, there is no Objection to the Cream being kept longer. In this Case it turns sour; but the Butter is not the worse for Market, unless it have been over-heated or otherwise ill-managed in the Churn. The fine Butter for present Use should always be made of perfectly fresh Cream; but for this marketable Commodity the other is rather preferable; for Experience shews that Butter made otherwise under the same Advantages, keeps better when the Cream has stood to be sour, than when it was so perfectly fresh, unless it turn bitter: this in Butter made from Cream that has been kept till sour, is always a Mark, and is always the first Mark of its tending to Decay; wherefore in that Case, the sooner it is used the better.

The fine Flavour depends on the Freshness of the Cream, but otherwise the Butter is not the worse for some keeping.

These are Particulars we shall consider more particularly in
a succeeding

a succeeding Chapter, treating of Butter, but thus much it was needful to say here, that the Housewife may exactly know not only how long her Cream is to be kept, but what are the Disadvantages of keeping it longer.

Having explained this Matter so far, we shall proceed to tell her what is to be done, when she is desirous of keeping it longer than it is possible for her to expect it naturally to last good.

The Days of Market often regulate the Days of churning: there is some Convenience in doing a good deal of Business in that Respect at once, and when there is but one Market near, and that but one Day in the Week, which in the Country in many Places is no uncommon Thing, it will be a great Convenience to the Housewife if she can contrive to churn but once in the Week, and to prepare all together for the Market. We shall suppose this the Case, as it is a very common one, and lay-down a Method by which she may in Summer be able to keep her Cream the whole Week without its growing sour, though in the common Course of Things it would be so in three Days.

This is to be contrived thus. We will suppose the Market Day THURSDAY. Then FRIDAY may be called with her the beginning of a new Week; but as her Cream will have been gathering sooner, we shall trace it from that Time.

In order to prepare for the Market on THURSDAY, she has been churning on WEDNESDAY, and she will have taken into her Churn the Cream of WEDNESDAY Morning, that is, what was skimmed from the Milking of TUESDAY Evening, the last that can go into the Account of that Week.

The WEDNESDAY Morning's Milking is set for Cream, and that is taken off at Evening but set by, this therefore is the first Parcel for the succeeding Week: to this is to be added all that follows till the WEDNESDAY Morning again, which she is to preserve for the Churn on that Day. Let every succeeding skimming be mixed with this first, and on SATURDAY Morning let her set all the Cream she has got over the Fire, and let it just once boil: this done let her put it back into a clean Pan, and then add to it all that is taken off the Milk during the following Part of the Week, but let her every Day change the Vessel in which it is kept, pouring it daily into a fresh one well cleaned and aired.

It is very strange to see the Effect of this, the boiled Cream not only keeps good itself, but by the Practice of every Day putting into a fresh and perfectly clean Vessel, it preserves all the rest from being sour. This has been frequently tried in the

the Neighbourhood where I now live, and when it has been done with due Care has always succeeded.

We have now conducted the Housewife from the milking of her Cow to the preserving of her Cream, as long as her Convenience requires, and as it is then to be made into Butter, that comes next under Consideration.

C H A P. XIV. *Of Butter.*

WE have observed that Butter is the oily or fatty Part of the Milk, which first separates of itself in Form of Cream, and after that needs but little Trouble, at least but little Art to bring it into the Condition of an elegant solid, yet soft Substance, pleasant to the Taste, and fitted for many Purposes.

When we consider Butter in this Light, of a Thing so very desirable, and so very easily obtained, it appears wonderful that the Knowledge of it came so late into the World; but 'tis certain that there were very many Ages in which it was not known, and many Countries in which it was not used in Food long after the rest of the World were perfectly acquainted with it.

The Greeks, Poets and Philosophers frequently mention Cheese, and yet the Name of Butter is not found in their Writings. It is certain that the only Use they made of Milk in those Times was to drink it alone, eat it with Mixtures, or make it into Cheese; for not only they are silent on the making Butter, but it is evident from the whole Tenour of their Writings, there was no such thing in use among them.

ARISTOTLE has written largely of Milk and its Products, but among these there is not a Word of Butter; he only treats of Cheese of several Kinds, and the Whey, of which there were also several Sorts, according to the Manner of making the Cheese.

The ROMANS made Butter; but what is yet more strange than the former, they, though they had it, never considered it as an Article of Food; they used it as a Medicine; and we read their Sentiments concerning it in PLINY, where we find they were well acquainted with its Use in other Countries. It is very well known that the People of the EAST INDIES knew nothing of Butter, till the DUTCH took it over to them.

We see in this an Instance of a very great Truth, which is, that the most familiar Things may be a long Time overlooked, and that what every Man wonders he did not find out himself

self as soon as the Secret is disclosed to him, Millions beside himself may have left all their Days undiscovered.

Butter is made from Cream by the Assistance only of Motion: this may be given it any Way, and provided it be in a proper Degree, the Effect will be produced. This Motion in the common Way of performing it is called churning; and the Uncertainty of that has led the Ingenious to contrive many Methods of supplying the Place of beating by the repeated Labour of the Hand, some of these are much worse than the old plain Way, and there are others that really deserve the Name of Improvements.

There are certain Particularities relating to Butter, much better known than understood: it will be very well worth while for those who have the Convenience of being upon the Spot, to endeavour to discover the Reasons. In the mean time all we can do is to mention the Facts.

SUFFOLK Butter is famous for keeping, which is a Quality of so much Importance, that every Method is to be taken in Hope of finding the Cause of it. Indeed there are Methods of making any Butter keep longer than may at first be imagined practicable; if good Butter be made up in Lumps of forty Pounds Weight, and a little more Salt be put in than is usually allowed, and they be afterwards put into a large Bin of Flour, they will keep the year round without Damage.

Toward the End of Autumn Butter is apt to taste bitter. This is one of those Things better known than its Cause; it has been said that the Reason is, that Grass beginning to grow bare at that Time, the Cows eat the Leaves that fall from the Trees; but however true it may be that Cows will feed in this Manner, it is not true that this is the Cause of the Butter's being bitter; because in the Fen Countries, where there are no Trees, and where Ditches serve instead of Hedges for inclosing, the same Thing is apt to happen at the same Season, as in Places where there is ever so great Plenty of Wood.

Though we cannot absolutely assign the Cause of this, we can tell the Housewife how to prevent the Damage, which is enough for Use if not for Curiosity. There needs no more to this than to skim the Cream after a shorter Time standing. We have observed before, that when Milk stands too long the Cream hardens on the Top of it, and the Butter made from such Cream is bitter; this shews that too long standing alone may be a Cause of Bitterness in the Butter, and for that Reason, where there is Danger of the same Accident from any other Cause, one would take Care to prevent this from joining to make it worse: on this Principle has been founded
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the Practice of skimming Milk earlier at that Season of the Year; and the Consequence has shewn, that this alone will prevent the Bitterness of the Butter, whatever else was the Cause that would have made it so.

In DEVONSHIRE, and some other Places, they make a particular Kind of Butter, which from the Manner of ordering the Cream, is called scalded Butter. The Advantage of this is not only its being particularly well tasted, but that it will keep a Month without Damage. The Way they raise their Cream for this Purpose is the same the Chemists use when they have a Mind to give any thing a gentle Heat, without burning it to the Vessels, and which they call a *Balneum Mariæ*, or Water Heat.

It is done in the scalding the DEVONSHIRE Cream thus.

They strain the Milk into Vessels as is usual, and set it by for the Cream to rise. Ten Hours afterwards, when the Cream is risen in the common Way, they set the Vessel with the Cream, Milk and all, over some Water in another Vessel, so that the Water reaches half Way up that wherein the Cream is: this done, they set the Vessel of Water over a Stove, and gently heat it till the Cream is thoroughly and perfectly risen, and the Milk underneath is quite thin and blue. The gradual and soft Heat does this, throwing up the whole Cream perfectly, and at the same Time doing it a great deal of Service, for the Article of keeping by the Heat.

When it is in this Condition the Cream is skimmed off with a skimming Dish full of Holes, and the blue Milk is let to run perfectly away from it.

In this Condition it is a Kind of clouted Cream, the Fire so gently conveyed to it has done it great Service; and it may be kept with proper Care several Days, so that enough of it may easily be got together for churning. All that is needful for preserving it during this Time, is shifting it once in four and twenty Hours into a fresh and perfectly clean Vessel. This is one of these Instances wherein we see the Value and Advantage of Cleanliness, but it is not particular, its good Effects are universal. As to the churning of this Cream no Difference is to be used from the common Method.

CHAP. XV. *Of churning.*

THE Cream is now ready for the Churn, whether fresh or kept according to the Rules we have given for that Purpose, and we suppose the Time arrived when Convenience calls for the making of the Butter. We shall consider first

the common Way of making it with the old fashioned and long used Churn. This is a Vessel of Wood, tall and deep, widest at the Bottom, and narrower to the Top, where it has a Cover that falls in close, and has a Hole in its Middle. Through this Hole is let the Handle of the Instrument, wherewith the Cream is to be beat; this consists only of that Handle, and a round Board, like a broad thick Trencher at the Bottom, in Size suited to the Middle of the Churn. When this is put in, the Handle is let through the Hole of the Cover, and that is then put on and fastened down. This is the whole Contrivance of this familiar and useful Instrument; all that is required for making of Butter is well beating of the Cream. And it is very well done by this Instrument, for the Cream being in the Churn, the working of the Handle up and down in the Hole of the Lid naturally agitates and beats the Cream, and the fastening of the Cover prevents its rising out.

This Churn, which is the good Housewife's old Implement, is to be made clean with all possible Care, by thoroughly washing and scalding, and then exposing it to the Air to sweeten and purify. When every Part belonging to it is thus perfectly cleaned, it is to be brought into a proper Part of the Dairy, and this differs according to the Season, for which Reason there can be no particular fixed Place for its standing.

All Niceties are to be observed in churning, for it is well known to the Housewife, to be a very precarious Article; and often when all the Care possible is used, the Work goes on very vexatiously, and the Butter will not, as they express it, of a long Time come.

A moderate Temperature of the Air is the most favourable for the working of Butter; wherefore, according to the Season of the Year, this must be favoured by the Place of the Churn. In every Dairy there are some Places warmer and some cooler than others. Now in Winter the Churn must be set in the warmest Place; and in Summer on the contrary it must stand in the coolest, for the Success of the Work.

In the same Manner the Time of churning must be varied according to the Weather. In the Heat of Summer, the Weather being naturally too hot for the making of Butter, no Hours are proper but either very early in the Morning, or very late in the Evening, because then only the Air is in that temperate Way, so essential to this Business; on the other Hand, as the Air is too chill and cold in Winter, the same Caution must be used in an opposite Manner of Choice, that

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is, the Middle of the Day, and no other Time is to be taken, because it is at the Noon Time alone, in these Seasons, the Air is any thing like temperate.

The Hour and the Place of the Churn being fixed, the Housewife has nothing to do but to go to work. She is first to stretch a coarse, strong, and very clean Cloth across the Top of her Churn, and into this to pour the Cream. Cleanliness we have all along prescribed as the first Virtue of the Dairy, but here it is so very essential, that the Admixture of the least Particle of Dirt might prevent the whole Business, and all the Labour be done in vain. When the Cream is strained and pressed through this Cloth, the Churn is to be covered in with the whole Preparation, and the Maid is to go to work.

There is great Uncertainty as to the Time of the Butter coming, but this depends more upon the Manner of beating, than any of those fantastical Causes to which it has been assigned. Thus a heavy, tedious, dull Manner of beating gives the Cream Time to gather again between Stroke and Stroke, when it was about to break; and on the contrary, the swiftest Work does the most Business. Therefore let the Mistress first examine the Manner of working of those who complain, she will commonly find Laziness is the Devil in the Churn, that sets his Spell upon the Butter. Let her oversee the Work at first, and see it is done briskly, with swift, sharp Strokes, and tell the People, for their own Sakes, to continue it in the same Manner.

She will know by the Sound of the Strokes how the Work goes on. At first the Noise is deep, found, and heavy; but after a Time, the sooner the sharper the Strokes, it will begin to be higher and sharper. This is a Proof the Cream begins to separate from the thinner Part that yet remained with it, or as they commonly express it, that the Butter comes: the Work is now to be continued with the same Spirit and Earnestness, and the Effect will soon follow. The Staff will be perceived to work lighter; and soon after this, upon opening the Churn, and examining the Top of the Lid on the Inside, there will be found Drops sticking to it that look yellow. The Butter is now coming, and there will soon be an End of the Labour, for these Drops are absolute Butter, and when the Change is thus perfect in one Part, it will not be long before it is so throughout; after a few Strokes more let the Churn be again opened, and there will be found Butter on the Sides as well as Lid, and every where, so far as the Splashing can reach.

The Butter is now made, and is only to be got together. For this Purpose the Lid and Inside of the Churn must be scraped clean, and the Butter, which is got off from them, must be put down among the rest into the Body of the Churn; then all is to be covered up again, and the Work continued, but not with hard downright Blows, but with a Kind of slight rounding Strokes; for all that is to be done now is to get the Butter together into a Lump in the Churn, that none of it may remain in separate Pieces. When this is done the Butter is finished, and is to be taken out of the Churn.

This is the general Method; and these which we have named are the Cautions always to be observed: but having thus far explained these, we shall now enter upon those Particulars which promote or retard the Formation of the Butter in the Churn, that the Housewife being aware of what will prevent her Success, may guard against it; and knowing what will forward it, may pursue it.

The Temper of the Air we have named already, as a very great Article, and are to repeat the same here on another Occasion; for it not only may retard the coming of the Butter, but may spoil it when it is made.

Over hot Weather not only makes churning difficult, but the Butter, when it is made, is so far influenced by the Weather, unless properly guarded against, that it is whitish, brittle, and bitter; we have shewn how to avoid these Accidents, by taking an early or late Hour and a cool Place. The early Hour is better than the late, for the Air is cooler in the Morning before the Sun rises, than it can be in the Evening, after it is set, because in one Case it has been heated all the Day, and in the other it has been all the Night cooling; as to the Place, the hotter the Season the cooler that must be. I have seen very fine Butter made at Noonday in August, in an Ice-house. This may serve as a Proof how possible it is to countervail any Heat of the Air, by the Coldness of the Place. Ice-houses are not in the Farmer's Power, but neither need he use the Middle of the Day for churning, a cool Cellar, or the deepest and remotest Place in his Dairy, two Hours before Sunrise in a Morning, will be equal in Coldness to the Ice-house at the Middle of the Day.

In the coldest Time of Winter it is often very difficult to make the Butter come at all; and I have seen so much of this, that I think the Experiment I saw tried in the Ice-house could not have succeeded as it did, were it not that the Cream when carried in had a great deal of Heat in it from the com-

mon Temper of the Air, and the Butter came before the extream Cold of the Place had any great Effect upon it.

Having thus laid down the general Principles, and explained the Reasons of the Difficulties which often perplex the Housewife in her churning, we shall in the next Chapter lay down a few, plain, easy, and practical Rules for her Assistance.

CHAP. XVI. *Particular Rules relating to churning.*

IN Summer, as the Heat of the Air is the Occasion of the Difficulty in bringing the Butter, the Housewife must take all possible Means to prevent adding to the natural Heat of her Cream, and to cool it gradually.

We have advised very brisk working of the Staff in general, but here must be a Kind of Exception, for too much Motion will occasion Heat; and therefore in extream sultry Times it will be better to manage the Blows accordingly, making every Blow smart and sure, but not repeating them so quick upon one another.

There is some Mystery and Art in churning at any Time, but it is at this that the main Difficulty occurs; and if it be not managed according to these Directions, there will be a great deal of Perplexity and Plague.

In the next Place, let the Housewife take Care that she does not add to the Heat occasioned by the Weather, by any Heat in the Churn itself; and farther let her abate the Heat when it is naturally so much that nothing can be done by cooling it.

With Respect to the first Article, as her Churn is to be scalded in order to make it perfectly clean and sweet for the Use, let her take Care that it be thoroughly cooled, before she puts her Cream into it. Scalding Water gives a great deal of Heat, and Wood keeps it a long Time: therefore let the scalding of the Churn be the first Thing done in the Preparation for the Work, and let the Churn be thoroughly examined by the Hand half an Hour at least before it is used, that it may be cool. Wood will retain Heat when the Hand does not feel it, but half an Hour's cooling, after no more is perceived, will set it right. To add to this in very hot Weather it will be well to wet the Outside of the Churn with Pump Water fresh pumped, a little before the putting in the Cream, but the Inside must not be wetted so near the Time.

Under these Cautions, and using the proper Hours, there is Reason to hope the Butter may come without much Diffi-

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culty; but if, after a moderate Time, there be no Appearance of it, as nothing can be reasonably supposed to be the Cause but Heat, let a Washing Tub be a third Part filled with fresh pumped Water, and brought to the Place where the Maid is churning; let the Churn be placed into this, and if the Water do not reach as high up the Outside of it as the Cream rises within, then let more be added till it does: let the Work be now carefully continued, and commonly, as soon as the Effect of the Water is felt through the Wood, the Butter will begin to come. It is not only that the Cream is thus brought to that Condition of Warmth, in which the Butter comes best, but the sudden Change is of great Assistance: the same Effect that the cold Air of the Ice-house in the before-mentioned Experiment had upon the Cream, the sudden Chillness of the Water shews in this Case; and doubtless, as a considerable Change is to be made in the Thing itself, for the Difference is really great between Butter and Cream, this quick Shock, better than any other Way brings it about.

These then are the little Particulars by which the Housewife will be able to assist herself, in Cases when the too great Heat of the Weather prevents her Success; on the contrary, when her Difficulties are owing to too cold an Air, she must, in the same Manner, assist Nature by giving a little Warmth.

We have advised her, in the other Case, to be very careful the Churn be cool from the scalding, but in this she will do well to examine the Vessel how it cools by Degrees, and to strain in her Cream while there is yet some Warmth remains in the Churn, from the Water that cleaned it. This will give a little Help to the Cream; and the Maid must be ordered to work it more briskly than ordinary; indeed the Coldness of the Weather usually puts her in Mind of this, and the less Admonition is needful.

If with this Assistance the Butter do not come, let the Churn be taken into the Kitchen, and placed not within the Reach of the Fire directly, but in the Air of it, this will by Degrees bring the Cream to the due Temper. Then the Work of churning is to be continued briskly, and it will not be long before there come good Butter.

There is generally more Trouble in getting Butter in very cold Weather, than at any other Time, but by these little Assistances it will be greatly alleviated; and there is nothing in all this that will be at all prejudicial to the Taste or Colour.

C H A P. XVII. *Of the washing and making up of Butter.*

TH E Butter being now formed in the Churn, and by the last Strokes worked together into one large Lump, is to be taken out and finished by a gentler Operation; the Strokes of the Churn would be now too harsh, it must be moulded in the Hands into a better Consistence.

It is to be understood that Butter, when thus made in the Churn, is far from its Perfection. It is separated from the watery Part in some Degree, but not entirely. The whole Operation depends upon this, that as in Milk there was a richer Part and a poorer, which being separated by standing, the richer Part swims at the Top, and is Cream; so in the Cream itself there are two separate Substances, an oily, which is properly the Butter, and a watery, which is the Buttermilk. The separating of these is what we call making of Butter.

This Separation is performed by agitating of Cream in a due Degree of Heat, and this being done perfectly the Butter is perfectly made. Now the Churn does this but imperfectly, being a clumsy and unwieldy Instrument; but it makes a good Beginning, and the Hand is afterwards very well able to finish it.

This finishing consists in two Articles, the perfectly separating the Buttermilk, or thin Part, and the cleansing the Butter from any accidental Foulnesses that may have got into it, for this is always possible; and it is to be done in this Manner.

The Lump of Butter in the Churn is to be taken up with both Hands, and removed out of the Liquor. In this there comes a Consideration, which is only to be determined by the Time the Butter is intended to be kept: if that be short, that is, if it be made for immediate Use, it is to be thrown into Water immediately, on taking it out of the Churn, if otherwise, not.

Therefore whichever be the Case, let a very clean Pan of Earthen Ware glazed, be set ready by the Churn, and if the Butter be designed for Use immediately, let this be half full of clean fresh Water; if not let it be empty.

The Lump of Butter being lifted out of the Churn must be put into this Pan, and there worked thoroughly to and fro in the Water, or without, labouring it with both Hands, and moving it frequently about; by this Means the Buttermilk

that remained in it after the churning will be thoroughly washed out, and the Butter will be pure and of a firm and good Consistence: the well working, turning, and tossing the Lump at this Time of the Operation is a very material Article, for to that alone the Butter owes its Purity, its good Consistence, and in a great Measure its Colour, at many Times of the Year. I have seen Butter that looked white and chalkey, on taking out of the Churn get a very good pale Straw Colour; in the frequent and repeated working in the Hands among Water.

The Buttermilk being thus perfectly separated, one of the two Points intended by the working in the finishing of it up, is obtained; the other is the perfectly cleaning of it.

So much Care as we have advised, one would think, would keep out Dirt from the Butter, but it does not always happen; for a Rag of the straining Cloth, a Hair, or some other Impurity, may escape the Observation; and any thing, the least imaginable in this Kind, may damage the Butter in the Respect of Sale, and will always be a Blemish in the good Housewife's Character.

The working the Lump in the Hands may discover some Foulness of this Kind, which must be picked out as soon as seen; but lest any should have escaped the Eye, the whole must now be taken out of the Water, and cut cross and cross many Times with a Knife, till every Part of it have had the Knife in it, this will find out any little Thread or Hair, and thus it is to be made entirely clean.

The last Thing to be done is the salting. We are not here speaking of the salting that is to prepare Butter for long keeping, but just of that which is done to give it a Relish. Butter is very insipid when it is made up entirely without Salt, so that the freshest should always have some. It is to be worked into it in this Manner. The Butter that has been cut and cleaned is to be spread out thin with the Hand, in the Bottom of a broad shallow Dish; and then a very little Salt is to be sprinkled carefully over it, the Design being to mix it as equally as possible in the whole Quantity; it is then to be worked up well in the Hands, and is done: it may be wrought up into Rolls, Lumps, or Dishes, or formed in any Shape most saleable at Market, or most convenient in the Family. Having thus gone through the whole Work of making Butter, and making it up fresh, we shall proceed to the salting of it, that being a very essential Part in the Farmer's Traffick in some Places. But here, as we have named only the plain good

good old Family Way of churning, it may not be amiss to observe that there are others which have their Use.

The Sweep is a Kind of Churn which works in the Manner of a Pump, and is used with a great deal of Ease and Advantage in many Places: in other Parts of ENGLAND they prefer the Barrel Churn, and it also answers very well: these Instruments are to be had at the Turners, therefore I shall say no more of them here, as I shall not take upon me to recommend them, though I allow they are good in their Kinds; the other always, so far as I have seen, very well answering its Purpose.

The greatest Preference that is made for using these, is the Quantity they can manage, and the Expedition of the Work; but I have seen twenty Gallons of Cream wrought at once in a common Churn, big enough to hold thirty; and this Quantity brought to Butter in about an Hour. When the Quantity is so large a Woman alone is not able to manage it, but a Man and Maid do it perfectly well.

In hot Weather Butter, though very well made, will sometimes continue too soft; and this will be a great Disadvantage in Respect of the Carriage to Market, and sometimes hurts the Sale. In this Case, as the Cause is known, the Remedy is easy. Too much Heat being the Occasion, a little additional Cold will set all to rights. This may be done with great Ease by the Help of a Well, which is a Convenience few Farms want. Let the Butter, when it is thoroughly made, and properly salted, be rolled into Lump Pounds, or half Pounds, according to the Demand there is expected for those several Sizes, and put carefully into a Basket: let a long Rope be fastened to the Handle of this Basket, and let it be let down into the Well till it come within two Feet of the Water. In this Way let it hang all Night, taking Care no Accident happen to it by Thieves or Carelessness of Servants, and in the Morning let it be drawn up and sent to Market. The cold Air that lies just above the Water in the Well, will have the same Effect as the natural Cold of Winter, and it will be as hard as Butter commonly is in NOVEMBER.

With Respect to the salting of fresh Butter, the particular Fancy, and Taste, and Custom of the Country, are to be so far considered, that it is very difficult to establish any general Rule; but in a moderate Way we may say, that a Pint of Salt will serve for twenty Pounds of Butter; some go as far as a Pint and half for that Quantity, but 'tis too much, for only the Flavour of the Salt is wanted, to take off the
Insipidity

Insipidity of the Butter: therefore the least that will do is best; but those who go much under a Pint to twenty Pounds do not answer their Purpose, for the Salt is not so much as tasted when so little.

C H A P. XVIII. *Of the making of Butter from new Milk.*

AMONG the Improvements that have been made in Husbandry of late Ages, this may be very justly reckoned one, for in large Concerns it shortens the Trouble of a Dairy very much. As we have given the Rationale of Butter-making in the preceding Chapter, there will not appear any thing strange or wonderful in the Attempt, or in the Success of making Butter without the Trouble of first setting the Milk for Cream.

It has been seen that when Milk stands an oily Part separates, mixed with some Water, this is Cream, which consists of Butter the oily Part, and Buttermilk the watery. This is afterwards beat, that by means of the Motion the remaining watery Part may be separated from the pure and oily.

Now it is plain that this oily Part which is wanted for Butter is originally in the Milk; and there is no Reason to wonder that beating, which in the common Way of working, drives out the watery Part, and separates the oily from the Cream, may in a greater Degree, separate this oily Part at once from the Milk.

This is the Principle upon which they proceeded, who first set up the Scheme of new Milk Butter, and it answered accordingly.

It is for this Use that Machines, and other Contrivances, are to be called in to the Assistance of the Farmer, the Quantity of Milk not reduced to Cream being too great for the good old Implement the Churn; and the Labour required for separating this oily or buttery Part from it, is so much greater than is needful for Cream, that no human Creature could be well expected to go through it. Therefore it has been properly contrived for this Purpose, that the Vessels shall be very large, and easily put into a violent Motion, and that the Work shall be performed by a Horse.

In some Places they contrive to use an Implement not unlike a common Churn for this Work, but it does not do near so well as those Barrels that run round, with Stops in them for that Purpose.

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The Farmer who has a Mind to fall into this Way, will easily get the Machine, the Structure of it being sufficiently understood among the Mechanicks in most Parts of ENGLAND; but he may, by fresh Contrivances, save himself a great deal of Labour and Trouble: he may contrive his milking Place in such a Manner, that the Milk may come directly from the Cow, through a Pipe, into the Vessel; which, when the milking is over may be set in Motion, and at once make the Butter.

As we have named the Benefit of this Method, which is for the managing a great Quantity of Milk with little Trouble; it will be proper we fairly set before the Farmer also its Inconveniences. The principal of these is, that the Butter made this Way, though very good for present Use, is not found to keep so well as that made in the common Method.

The Buttermilk that is made this Way supplies a tolerable Kind of Cheese with little Trouble: they let it out into other Vessels, and then add Rennet, and it comes to a Curd very readily.

Having thus gone through the Articles that naturally fell in the Way, before we come to the salting of Butter, we shall proceed to treat of that important Article in a plain and practical Manner.

C H A P. XIX. *Of salting of Butter.*

IT is often necessary, and always profitable to salt Butter at certain Seasons; but there are Times of the Year more proper than others. In general, the Butter of the early Part of Summer is not so proper for salting; and that of no Time is so good as what is made from the Middle of AUGUST to the latter End of OCTOBER.

The first Difference that is to be observed in the making, is when it is taken out of the Churn. We have ordered fresh Butter, that is, such as is intended to be kept fresh, to be put into a Pan of Water, and there worked with the Hands to get out the Buttermilk, but in the Butter intended for salting no Water must be used to this Purpose. 'Tis to be put out of the Churn into an empty Pan, and there worked between the Hands to squeeze out the Remainder of the watry Part.

This done the Butter is to be mixed with Salt, which is to be worked in with the Hands, the more the better, the Way is to spread out the Butter as in mixing that small Quantity of Salt with such as is intended for immediate Use; but instead of that small Portion, as much as can be got in is to be added here,

here, and when the whole is well mixed, the Butter thus prepared is to be put up in Pots or Barrels: for large Quantities Barrels are needful, but for lesser Quantities Pots are more proper; but they must be well glazed, otherwise the Brine will eat into them. In Pots it is proper to lay in a thin Bed of Salt before the Butter is put in, and when it is put up then to lay another Bed of Salt over the Top of it.

In many Places where they barrel up large Quantities, they also pierce Holes through with a Stick, quite from the Top to the Bottom of the Barrel, and making a very strong Brine, they pour in a Quantity of it over the Butter, and let it run down all these Holes, which is of great Service in preserving the whole.

Some, instead of a Bed of Salt upon the Butter when they have potted it, pour over it a Quantity of strong Brine, and this is no bad Method.

As for the keeping, which is the great Purpose for which Salt Butter is designed, though it must not be washed when taken out of the Churn, yet a great deal depends upon the getting the Whey well out, which can only be done by thorough working it in the Hands; and this is the more material, because otherwise it would dissolve and carry away a great Part of that Salt that was used in preparing it, so that it would fail.

As to the Quantity of Butter reasonably to be expected in proportion to the Number of Cows, Accidents will make a great Difference; but in the Butter Countries they generally account that they may, one Year with another, expect from ten Cows a Firkin and a half of Butter in a Week, in Summer; and from the same Number a Firkin in Winter. The Difference of feeding makes a great Variation in the Goodness of the Butter, and none is worse than such as is made when the Food is between wet and dry, as is the Case in the Beginning of Spring and latter End of Autumn, the Food being at those Times between Grass and Hay, and that Irregularity having a great Effect to the Disadvantage of the Milk.

There are two Ways of making Salt Butter fresh, when there is Occasion for it; and it is possible, by salting up the Butter in the cheap Times, and freshening it when dearer, to make some Advantage.

The Method for the Service of a Family is by beating it up with new Milk; but when it is done by Way of Advantage, and for the Market, the Way is to cut it into thin Slices, and put it into the Churn where Cream is beating for fresh Butter. A good Quantity may be added in this Manner, but there

there is an Art in just hitting the Time. It must be put in when the other Butter begins to come, otherwise it will pervert and disturb the Operation; but in this Manner it goes on very well with the rest, and if not too long kept will, on being washed with the rest, pass with it as very good fresh Butter, not at all debasing the Price.

C H A P. XX. *Of Whey Butter.*

WHEY Butter is a Thing little known in LONDON, but 'tis often made in the Country, for the Service of Farmers Families. It is like other Butter, but poorer and rank; and made from a Cream got out of Whey, as the other is from the Cream of new Milk. We have shewn how a Kind of ordinary Cheese is made from the Buttermilk, when new Milk is Churned for Butter instead of Cream; and in the same Manner in this Instance, a poor Kind of Butter is made from the Whey of Curds made from new Milk.

All this depends upon one and the same Principle, which that all the succeeding Part might be naturally understood, we laid down in the Account of Milk. This is that there are in it three distinct Substances, an oily, a curdy, and a watery Part; now by whatever Method any one of the two first is separated, the other will always, more or less, remain in the watery Part that is left. This is the whole Matter. When new Milk is wrought at once for the Butter, the curdy Part is left behind, and the Addition of Rennet to the Remainder makes a Kind of Cheese; and just so when Rennet is at first added to new Milk, the curdy Part only is separated, the oily Part remaining, in some Degree, in the Whey; and this oily Part being separated from the Whey makes the poor Kind of Butter, thence called Whey Butter.

The Method of making it is thus: When Curds have been made from new Milk, the Whey which is drained off is to be set in large Pans, or other broad and shallow Vessels, and placed in a quiet part of the Dairy, just as new Milk would be for Cream: there will rise a Cream upon this, though not like that from new Milk, and it is to be skimmed off and churned in the same Manner.

The Butter this yields, we have observed, is very poor, but in some Places they enrich it, by adding a fourth Part of new Milk Cream to the Whey Cream; these, in any Proportion, mix very well together, and the Butter is the better according

as the more of the new Milk Cream is used; that bringing it so much nearer the Nature of the other.

Beside the inferior Quality of the Whey Butter, its Quantity in proportion to the Cream, is but poor. The same Measure of Whey Cream yielding but about half as much Butter as the other: neither will the Whey Butter ever come to a good Consistence, nor will it keep; so that at the best it is but a very poor Matter: however, it may be worth the Farmer's while, in most Cases, to make it.

C H A P. XXI. *A Method of taking off the ill Taste of Milk.*

WE have observed that however uncertain we may remain, as to the Cause of the ill Taste Milk has at certain Times, yet the Effect is constant, and is very prejudicial to the Farmer; the Taste being communicated from the Cream to the Butter, and reducing its Price and Estimation. To the Methods we have laid down for the preventing and remedying of this Evil, we shall here add a new and very particular one, the Invention of Dr. HALES, an Author not more distinguished by his Genius, than by the constant Application of it for the Publick Good.

We have occasioned the Method proposed by the Gentleman, to be tried, and have found it answer so well that we shall not scruple to assure the Farmer, it is not more singular than successful. The Instrument to be employed for this Purpose is very easily made and of small Expence, and the Use of it very familiar. We shall therefore advise every Farmer to have one of them, and never to fail of using it when he perceives his Milk to be ill-tasted, from whatever Cause that may arise.

The whole is no more than this: A round Tin Box is to be made, of six Inches Diameter, and two Inches in Depth; the Lid of this Box is to be pierced full of Holes; they should be about a quarter of an Inch distant from one another, and a twentieth of an Inch in Diameter. A Tin Pipe or Nozzel is to be soldered into the Middle of the Lid, and to rise to some Height above the Surface, so as to receive securely the End of a long Tin Pipe, through which the Air is to be conveyed into the Box; through the Holes of which it is to be blown up again through the Milk; this Tin Box being placed at the Bottom of the Vessel.

The Tin Pipe that goes into this Nozzle is to be a little more

more than half an Inch in Diameter, and two Feet or more in Length, according to the Depth of the Vessel.

To the Top of this strait Pipe is to be jointed and soldered on another, at right Angles. This should be of the same Bigness with the other, but it need not be more than six Inches in Length.

To the End of this that is free, a Leather Nozzle or short Pipe is to be fixed, and then the whole is compleated.

The Cover or Lid is best made deeper than the Box, and scallop'd in the Part that goes in; this lets the Air Holes have free Passage, and there is to be a Row of them on the upper Edge, where it is not received into the Box.

Every Tinman will be able to make this Instrument, and the most ignorant Servant may be instructed to use it: the Principle whereon its Benefit depends is this. The ill Taste of Milk is so lightly mixed with it, that it may in a great Part be carried off, by blowing a Quantity of Air in disperfed Particles through it; and this is to be done very conveniently by the Instrument now described.

The Tin Box is to be placed in the Middle of a large Vessel, into which the Milk is to be poured as it comes from the Cow. The Tin Pipe is to be put into the Nozzle prepared for it, and when this is well fixed the Milk is to be poured in. Then, the Box being kept firmly at the Bottom, the Nose of a Pair of common Bellows is to be put into the Leather Nozzle at the Top, and a Person is to blow for some Time.

The free Air is thus taken in by the Holes at the Back of the Bellows, it is forced down the Pipe by the Strength of the Blast, and it rises through all the Air Holes in the Box, and thus passes in so many small Streams up through the Milk.

When the Milk is but slightly ill tasted, it is thus to be poured into the Vessel, as it comes from the Cow, and about forty Minutes blowing will perfectly sweeten it; but when it is very rank the best Method is to make it scalding hot, and then pouring it in, to continue blowing till the bad Taste is perfectly gone.

This Method, under proper Management, will make, at any Season, perfectly fine Butter out of ill tasted Milk. In this last Case a great deal of Care must be taken not to burn the Milk to the Vessel in heating; and it should be kept warm during all the Time of the blowing.

The Author of the Experiment tried it upon the Milk of a Cow fed with Cabbage Leaves for eight and forty Hours; and though the Milk was very ill tasted in itself, it became perfectly sweet in ten Minutes blowing. This was an Experiment

rimment with only a Gallon of the Milk, and it was kept hot by being set in hot Water during the blowing. The Cream produced by this had not the least ill Taste.

Some Caution must be used in blowing into large Quantities of Milk, because of the Abundance of Froth that will rise. If the blowing be too violent, this will swell over the Top of the Vessel, therefore it is to be managed gently. The blowing must not be so brisk but that a Person standing by may break the Bubbles, and keep the whole within Bounds; it will take somewhat the more Time the slower the blowing is performed, but the Business will be done as effectually.

But though the blowing may be performed more gently or more forceably, and the Effect be the same in the End, the Heat of the Milk must be carefully observed, for otherwise, when the ill Taste is considerably great no Art will get it away.

The Experiment Dr. HALES tried, by feeding the Cow on Cabbage Leaves, was a very fair one for this Purpose; for excepting Crow Garlick, which the Creatures sometimes eat in the Fields, there is nothing that gives the Milk so lasting an ill Taste. A Cow's Milk will be made rank by Cabbage Leaves a Week after the Time of her eating them.

Crow Garlick gives so strong a Flavour to the Milk, that no blowing will take it perfectly off when it is cold, though it abates it sensibly: but if the whole be kept warm for some Time, and well blowed, the Scent and Taste will be carried entirely away.

When Milk is to be blowed in this Manner, for the taking away its ill Taste, it will be proper to mix a little Water with it first. This Water should be cold in Summer, if the Milk be blowed cold; and warm in Winter: but if the Milk be heated, in order to the perfect curing it by blowing, then the Water should be put to it warm.

It is found, by Experience, that the Cream separates better from Milk for the Addition of a little Water in the common Way of Management; for it thins the whole, and by that Means the Cream more easily disentangles and separates itself. In the Method of blowing it answers a double Purpose, it renders the whole Body of the Milk thinner, so that the Air passes more thoroughly and freely between its Parts, and the Surface is less frothy; so that the blowing may be brisker, and therefore the Operation shorter, and the Cream always rises after this in a very free and perfect Manner.

There is one very peculiar ill Taste that Milk has, and consequently the Cream rising from it, and the Butter made from that: this is a dead offensive Flavour, worse by much than
any

any of the rank Tastes named already : it rises from the Cow's drinking stagnating, foul, and stinking Water. The Farmer should, by all Means, prevent it, for it not only hurts the Credit of his Dairy, but endangers the Health of his Cattle; on this we shall treat farther in its proper Place, when we come to consider the Disorders of Cattle, their Causes and their Remedies; what concerns us here to observe is, that the ill Taste may be got rid of by this Method of blowing Air through the Milk : but it requires the whole to be kept warm, and the blowing to be continued some Time.

All the ill Tastes that happen to come into Cream are first in the Milk, and the best Way of attempting to remove them is always in the State of Milk, before the Cream is separated.

In some of our Counties, when they perceive their Cream to be ill tasted, they heat it scalding hot, stirring it all the Time it is heating, and also till it cools again; and in other Places they heat the Milk for this Purpose before it is set for the Cream. Both these have a good Effect; but probably the heating of the Milk, when properly managed, will be found the best Method.

With respect to the curing the ill Taste, by this Method of blowing, it must always be done to the Milk, not the Cream, for many Reasons. It is more conveniently performed in the thin Body of the Milk, than in the thick Substance of the Cream : the thick Body of the Cream sends up a Froth in the blowing, which is quite unmanageable; and what is much more essential, the Matter which causes the ill Taste, is much more difficultly removed in the Condition of Cream.

We have observed that the Addition of Water to the Milk assists and shortens this Operation, by thinning the Body of it; and from the same Reasoning it must be more tedious, as well as more difficult, to get it out in the State of thick Cream; and so it is found upon Trial.

These are the Reasonings and Observations of that excellent Philosopher, confirmed and extended by some few Trials; the Success of which seems to promise, that there will be great Advantage to the Dairy, in bringing this new Practice into general Use. We are sensible it will seem strange to the Country People at first; but a fair Trial will recommend it to them, and it will soon be universal.

C H A P. XXII. *Of the Use of the Barrel Churn.*

TO this general Account of the making of Butter, we shall join for the Sake of those who like Improvements, the Manner of using the Barrel Churn: how far it is to be esteemed we have said already, but when it shall be introduced into any Dairy there requires a particular Management of it; and without the Knowledge of that the Farmer may never come at its real Advantages.

The best Way of making Butter with this, is out of Cream got in the usual, careful, and cleanly Way, as we have described it before.

This is to be strained into the Barrel Churn, as into the other, and the Advantage is, that turning upon a Spindle, the Motion of this Churn, if well managed, is more regular than that of the other. But at the same Time we are to tell the Housewife, that there requires a great deal more Skill in the Use of it.

The greatest Mistake I have been used to see made with this Churn, is the turning it about too quick. This is a very natural Error; for those who know the Value of quick Strokes in the other, naturally fancy the quicker the Motion here the better; but the contrary is true, for I have seen Butter made and unmade again many Times over, by working it in this Manner.

On the contrary the right Rule is, that the Turning be gentle, slow, and steady; for this soft Motion on the Spindle is equal to a very sharp beating in the downright Way. When this turning is done in the right, even, and easy Manner, the Butter comes quick, and comes very pure and fine.

It is naturally hard, sweet tasted, and will keep; whereas the single Article of too violent turning will make the very same Cream, in the same Churn, yield a soft, bitter Butter, that will not keep. One Thing farther must be observed, which is, that this gentle Motion must be kept up without Interruption, from the first Turn till the Butter comes, for all goes backward upon stopping. When the Motion has been too brisk, and the Butter is near made by it, I have seen, that on stopping a Minute only, the Cream and Buttermilk have mixed again almost as entirely as before, and the whole Work was to have been done over again, little otherwise than as if the Cream were then put fresh into the Churn.

We have told the Housewife she is to see the Barrel Churn
turned

turned constantly, without ceasing, till the Butter comes: she needs not to open it to examine into this, for she will know by the Sound: there is a particular squashing Noise in the Churn when the Butter is come, which is quite different from what the Cream made in it before: when this is heard she may be as sure the Butter is made as if she could see it, and then she is not to order the Servant to stop, but only to turn more softly and gently than before. This serves to finish the Separation of the oily or buttery Parts, and to bring them together into a Lump or Mass: this must be continued half an Hour, and by that Time all will be perfectly done.

The Butter is then to be taken out of the Churn, and well worked with the Hand; and the Salt mixed with it according to the Intention of spending it fresh, or keeping.

In this and all other salting of Butter, it is a good Method to have the Salt beat to Powder: some have used Basket Salt, because of its Fineness, but it is dear and has little Taste, in Comparison of the other. Every Housewife knows how to powder common Salt, by first drying it, and this is the best for the Use of salting of Butter.

In churning by the Barrel Churn all the same Cautions are to be used as in the other Way, respecting the Season of the Year and Condition of the Vessels. The Churn of this Shape must be kept as carefully and perfectly clean as the other: in Summer it must be well cooled from the scalding, or occasionally fresh cooled, just before the putting in the Cream, with cold Pump Water; and in Winter it should be left warm from the scalding. In these and all other Respects, the Difference only is in the Manner of giving the Motion to the Cream, and the whole Procedure, from the straining in of the Cream to the working up of the Butter, is to have no Difference.

C H A P. XXIII. *Of Cheese.*

CHEESE is the Article next in Consideration to Butter, when we are treating of the artificial Products of the Farmer's Stock: it is made, as we have shewn in general before, of the curdy Part of Milk, as Butter is of the oily; and according to the Condition of the Milk, and other Circumstances, it becomes of various Kinds, Tastes, Qualities, and Prices.

All Cheese is the curdy Part of Milk, separated from the Whey: but in some Kinds it is only the curdy Part, without the oily or buttery; and in others it is the whole mixed to-

gether, only the Whey being separated: there are also Kinds of Cheese that have different Proportions in this Mixture. In general, as it is the curdy Part of Milk that gives the Consistence and Form to Cheese, so it is the creamy or buttery Part mixed therewith, that gives it the Mellowness and Richness.

The Farmer's Servants well know what Cheese that is which is made of new Milk Whey, whence all the Butter has been taken; and the Cheese of PARMA, and other of the ITALIAN Dairies, shews us how excellent a Production it may be, when the whole of a rich Cream is mixed among the curdy Part in the working.

We have some Counties in ENGLAND remarkable for the good Cheese they produce, and others for the bad: this has by some been laid entirely upon natural Faults, as the Soil and Grass; but it is in a great Measure owing to the different Conduct in the Dairies of those several Places. We shall shew in the succeeding Chapters, that a good Housewife will make good Cheese any where. We do not mean by this that the Milk produced by the worst Food, will yield as good Cheese as that produced by the best, the Folly of such an Assertion would be obvious to every one; but what we would have the Housewife understand is, that when the Food is the sweetest, richest, and best in the World, a bad Manager may make bad Cheese out of the Milk; and on the contrary, that one who understands how to make the best of indifferent Advantages, will make good Cheese upon poor Land.

There are two Ways in which Cheese is naturally spoiled by the Pasturage of the Cattle: the one is when the Food is so poor that it impoverishes the Milk, so that its curdy Part has neither the true Strength nor natural Flavour: and the other is when Weeds grow in Abundance among it, which give it an ill Flavour, the Principal of these are Melilot and Garlick. As to these the Remedy is easy, for they may be pulled up: as to the other, there is no Way of mending it, unless the Farmer have got better Pastures, into which he can put them; if not he must be content with indifferent Cheese.

It will then become the proper Consideration, whether he shall engage in the Cheese Way at all: and this he must learn by Trial of the Milk, to the two different Purposes of Butter and Cheese.

Although we cannot enter into the Secrets of Nature, so far as to penetrate Causes always, we have at all Times our Eyes open to Effects: these are so many Principles on which to found our Reasonings, or, what is better, our Conduct; and these will be sufficient for the Farmer's Purpose.

There

There are Pastures that yield a Milk fit for Butter, but not for Cheese, and others that yield such as is excellent for some Kinds of Cheese, but unfit for Butter. Therefore when the Farmer first sets himself down upon his Land, he is to consider first, which is the most profitable Manner of employing his Dairy in his Situation: if the Pasturage be equally proper for either Commodity, then let him principally turn his Thoughts to the making that which is most marketable; but if it will only serve well for one, let him take that, which ever it is; for Cheese and Butter are Things for which there will always be a Demand every where, although not equal in all Places.

Now when the Farmer shall find that his Land does not yield a Milk that gives good Cheese, let him try it for Butter: if it yields that good in its Kind, and plentiful, let him fall upon that Branch: but if it be really poor, and will yield neither well, then let him take the most saleable Article, which we suppose to be Cheese, in the present Case, and make the best he can of his Milk that Way. If he cannot make such as is of a superior Kind, a worse Sort will still fetch a Price; and we have told him how much may be done by good Husbandry, even out of the worst Materials.

Let him examine what is the Cause of his Cheese being bad, and remedy it as well as he can; if not at once yet by Degrees, and that according to the Nature of the Fault. The first Thing he is to do is to get the worst Weeds out of his Pastures; and then let him, by the several Means we have laid down in the former Parts of this Work for improving of his Land, set about the Work of amending in earnest. A little Expence will go a great Way in the Improvement of Pasture Grounds, if laid out with Discretion; and he will have the Satisfaction of every Day receiving more and more the Fruits of his Care and Expence in his Produce.

Having thus prepared the Farmer for getting over the greatest Difficulties he can meet with in the Cheese Manufacture, we shall lead him to the Practice, and shall begin by explaining to him the Nature, and directing the proper Management of the Article he uses for curdling his Milk, this is what is commonly called the Rennet, or Rennet Bag.

C H A P. XXIV. *Of Rennet or the Rennet Bag.*

CCHEESE, we have told the Farmer, is the curdy Part of Milk separated from the rest, at least from the watery Matter, in which it is originally mixed in the natural State:

the first Thing to be considered therefore is, how to get this Curd separated. It is a Property of Milk that it will curdle with any Acid whatsoever: this curdling is the Separation whereof we speak, it is the gathering together of the curdy or cheefy Part separate from the Whey.

As any Acid or sour Matter whatsoever will answer this Purpose, the Farmer has his Choice of a great Variety, but finding nothing agree so well, in all Respects, with the Milk as Rennet, that is the only one he uses. This is a very natural Preference, for most of the other Acids or sour Liquors are either of mineral or vegetable Origin: of the first Sort are Spirit of Vitriol and the like, and of the latter Juice of Lemons and Vinegar; now Rennet being an Animal Acid naturally agrees better with an Animal Fluid, such as Milk, than one of so different an Origin as any of the before-mentioned.

There is in the Stomachs of all Animals an Acid or sour Juice: Nature has given them this to assist in the Digestion of their Food, and it is in various Degrees in different Animals; and in the same Animal also, at different Periods of its Life, according to its Degree of Health.

Of all these Acids of the Stomachs of various Animals, there is none so gentle and so certain of always having an equal Degree of Strength as that of a sucking Calf. This therefore is what the Farmer prefers to all others, and is what he calls his Rennet or Rennet Bag.

That he may always have it in Perfection, we shall tell him what is its proper Condition. The Rennet Bag is properly the Stomach Bag of a young sucking Calf, that never tasted any other Food but Milk, and where the Curd lies undigested.

In the Spring Season let the Farmer recollect the Occasion he shall have for these Bags, and get himself a sufficient Store of them. And he must order and prepare them in this Manner.

First let him open the Bag, and pour out the Curd and thick Substance into a Bason, leaving the rest that is not curdled in the Bag.

Then let the Curd in the Bason be carefully examined and picked clean. There may be Specks of Dirt, Hair, or other Foulnesses among it; these must be all taken out, and the Curd is then to be washed in cold Water several Times. By this Means it will become perfectly clean and white. When thus cleaned it must be laid on a clean Cloth to drain, and then put into a clean dish; in this it is to be sprinkled well
over

over with Salt, using a Handful or more to this Purpose, and with the Hand rubbing well in the Salt to every Part of the Curd.

When the Curd is in this Condition let it be covered from Dust, and let the Bag be cleaned. This is to be done by washing it several Times over in cold Water. When it is perfectly clean let it be rubbed well with Salt, and then put in the Curd, which has been so well cleaned, with the Salt, among it. Finally let the Outside of the Bag be also well rubbed over with Salt.

There is a great deal of Nicety and Care to be used in this Preparation of the Rennet Bag, for on that depends its Value.

When a sufficient Number are thus got ready, let them be all laid together in a Pot, and the Pot tied down carefully. Now the whole Work is done, except what is to be the Effect of Time. These Bags will keep without any Danger of spoiling, and they are in their full Perfection a Year after the preparing them.

This is the right Preparation of Rennet, and a most surprising Thing it is that all this washing and cleaning cannot remove or get out the Acid of the Stomach from the Curd, but that it perfectly answers the Purpose of curdling the rest of the Milk, whenever the Farmer pleases; and that in a Manner greatly preferable to any other that can be named.

Though the Rennet is best after a Year's keeping, it may be used fresh and new; but the Effect is not so good. The Curd gets its right Condition from the very Time of its being separated by the Rennet; and a Fault at this Time is not to be remedied afterwards. When the Rennet is fresh, the Curd is not made so firm and strong; and the Cheese never gets a good, firm and even Consistence; therefore it is better the Farmer purchase such as are of a right Age, than use his own too soon.

The old Way of managing the Rennet Bag was, after a very slight cleaning, to hang it up to be smoak dry'd in a Chimney-corner; but that is by no Means so good a Way as the salting and potting a Number of them together: it is neither so cleanly, nor does it keep the Rennet in the needful Degree of Strength.

We have shewn the Farmer the proper Way of preserving his Rennet Bag, but there yet remains an Article very well worthy his strict Notice and Attention; that is the seasoning of it. This is to be done in the following Manner.

When the Bags have been kept a Year, let one of them be taken out of the Pot and opened. Let the Curd be emp-

tied out into a very clean Marble Mortar, and have its wooden Pestle also thoroughly and nicely clean: rub and grind it well by itself first; and then add to it the Yolks of three new laid Eggs, and half a Pint of fine rich and perfectly sweet Cream; rub and grind these together, and when they are well mixed, dry before the Fire one Blade of Mace, one Clove, and about eight Grains of Saffron: when these are so dry that they will rub to Pieces, powder them in a small Mortar and throw the Powder to the other Ingredients; then work all well together again, till it is so perfectly mixed as to appear but one Substance. When the whole is thus thoroughly blended let it be put up in the Bag again.

Then make a very strong Brine of Salt and Water, by boiling them together; let this stand to settle, and strain off the clear Liquor into a clean earthen Pan. Take about half a Gill of the Curd out of the Bag, and mix it with this Brine. This done close up the Bag again, and hang it up with the Brine, putting in four or five Walnut Leaves.

The Rennet being thus perfectly prepared, is to be set by for a Fortnight, and will then be fit for Use.

We have here set down at large the Management of one Bag; and according to this the Farmer must dress all the rest; and his Care must be to do them one after another, in such Time as he shall want them; so that he may always have one under another, and may never be obliged to use any one that is not duly prepared, and that is not a full Fortnight old in the Brine.

Some use less Care than this in the preparing of their Rennet, but it is sparing Trouble in a very wrong Article; for not only the Rennet is sharper, and goes farther this Way than any other, but the very Goodness of the Cheese depends, in a great Measure, upon it.

Some on the contrary use more Care and Caution: thus it is not unusual to add more Articles in the seasoning: and others boil a handful of white Saxifrage, or some other Herb, in the Brine: there is little Harm in these Things, but they are needless. We are for delivering fully every necessary Article, and caution the Farmer strictly and exactly to observe them all; but we would not load him with unnecessary Trouble.

This is the needful Preparation for the making of Cheese in general, and we shall now proceed to the applying it to the several Kinds, according to the most successful Manner of making them in those Places which have been famous for them; and whence many of the Kinds are named, beginning with that Cheese which is, in a Manner, universal; and which is, when well made, very good every where.

C H A P. XXV. *Of new Milk Cheese.*

NEW Milk Cheese, otherwise called Morning Milk Cheese, is a Kind of general Production of the Dairy, like fresh Butter. 'Tis made almost every where, and in most Places is very fine; but it must differ according to what we have said before of the Consequences of the Variation of Pasture; this, however, though it encreases or debases its Value, makes no Alteration in the Manner of preparing it, which is to be thus done.

In the Morning, toward the Time of the People's coming in with their Milk, let a clean and large Tub be set ready; and let the Milk brought in the Evening before, be very carefully skimmed.

Let the new Milk, warm as it is from the Cows, be strained through the Strainer we have before described, into this clean Tub, and then pour through the Strainer the Cream taken from the last Evening's Milk. This mixed with the new Milk will give it such a Richness, that the whole will often be equal to what is sold in LONDON, under the Name of Cream.

This is too rich alone, and therefore it is to be a little reduced, and at the same Time prepared for turning the better by some hot Water. This is to be poured in in such a Quantity as will serve to make the whole tolerably hot, which scalds the Cream.

When this is done the Business is to get it cold a little; to this End it must be moved about with a Dish, till it is no more than luke-warm.

It will now be in a Condition to receive the Rennet.

As to the Proportion of Rennet to Milk, that differs according to the Strength of the Rennet; but as we can very well determine the Strength of such as shall be made according to the Directions, we may be sufficiently exact on this Head. The Strength of the Rennet made thus is such, that a Spoonful is a very good Proportion for three Gallons of Milk; so that if the Quantity be one and twenty Gallons, the Farmer will know he is to put in seven Spoonfuls of Rennet, and in the same Proportion he is to use it, let the Quantity be what it will.

When the Farmer has computed, from his Quantity of Milk, how much Rennet he shall want, there will require some Care in the drawing it from the Bag. He must do this steadily and evenly, without stirring the Bag. When he has
got

got the due Quantity out he must strain it very carefully into the Milk. Let him not wonder at our recommending so much Care in this Respect, for if the least Particle of the Curd of the Rennet fall into the Milk, it will be unseen among the Curd it brings on in the whole, and then mixing up with the rest in the making of the Cheese it will taint and corrupt the Spot where it is; and every one accustomed to this Commodity, knows how dangerous it is to get a corrupt Spot, it never fails to spread and taint farther.

When the Earning or Rennet is put in, the Vessel is to be covered, and all is to stand quiet for half an Hour. This is the Time needful for the Operation of turning the Milk, that is, for collecting the curdy Part separate from the Whey: at the End of the half Hour the Cover is to be taken off, and if it be not come, that is, if the proper Separation be not made, it is not to be left longer for that Purpose, for the Expectation would be always fruitless, and the Loss of Time prejudicial; but more Rennet is to be put in. Beside the Difference of Strength in the Rennet itself, there is a very great Variety in Milk, some requiring more of the same Strength than other.

When the fresh Rennet is put in, the Vessel is to be covered up as before; and opened at Times to see the Effect. As soon as the Separation is well made, the Curd must be well toss'd and worked about in the Whey. The best Method of doing this is first with a shallow Bowl, and afterwards with the Hands.

The Bowl is to be used in rummaging and tossing it to and fro in the Whey; and when this has been done sometime, it is to be wrought and moulded, and worked together between the Hands, and then pressed forcibly down to the Bottom of the Tub.

The Curd being got to the Bottom, the Whey is to be skimmed off with a shallow Dish; and while this is doing the Cheese Vat is to be got ready to receive the Curd.

The Curd is to be lifted up with the Hands and broke, and pressed down into the Vat.

When the Vat is well filled, the Cheese Board is to be laid over it, and a small Weight put upon it. In this Condition it is to be left till all the Remainder of the Whey, not separated by the working in the Hands, is pressed gently from it.

When it has done dropping let the Housewife wet a large Cheese Cloth, and lay it over the Board, and then turn the

Cheese

Cheese upon it. Then she is to put the Cloth into the Vat, and put the Cheese in again. She is now, with a thin Slice, to press down the Sides every where, then turning the Cloth over it, it is to be carried to the Press, and there pressed with a good Weight.

It is to be in its present Condition half an Hour in the Press; after which it is to be turned into a dry Cloth, and then put there again.

This Practice is to be repeated again every two Hours; each Time using a fresh dry Cloth; and it is to continue in the Press till the Evening of the next Day: only the last Time it is turned, it is to be put into the Vat without any Cloth at all.

When it is, after this, taken out of the Press, it must be put into a Tub, and rubbed on both Sides with Salt. There it is to remain all Night; and next Morning it is to be rubbed again with Salt, first on one Side and then on the other, and left upon the Brine which came from the first and the succeeding Saltings. When it has lain thus three Days it is to be taken out, and laid on a Shelf to dry; and while it is drying the Housewife must continue her Care of it, wiping it once every Day perfectly clean with a dry Cloth, and then turn it on the dry Side: this is to be done every Day, till it be perfectly dry. At first it is fit the Cheese dry somewhat quicker than afterwards, which may easily be contrived by changing the Place.

This is the whole Process that is to be followed in making the new Milk Cheese, we have been the more particular in describing it, because it will let the Reader into the general Manner of doing the rest.

C H A P. XXVI. *Of a one Meal Cheese.*

THE Farmer will know we mean, by a one Meal Cheese, such as is made of the milking of one Morning or one Evening only; but the Morning is the proper Time, because the Day is then before him for the Business. The Reader unaccustomed to these Things might suppose we mean a Cheese to be eaten at one Meal; but we must keep the accustomed Terms: all we can do is to explain them.

A one Meal Cheese might properly be called a new Milk Cheese, or a Morning Milk Cheese, rather than that last described, because it is really made of new Milk only, or of the Morning Milk alone, whereas that has the Addition of the Evening's Cream; but we shall not be understood by those
for

for whose Sake we principally write, if we do not keep to the Use of those Terms they are accustomed to hear.

The one Meal Cheese is made, we have observed already, of the Morning's Milk, and nothing more, and the Method of making it is the same with that before described, only that it is not so difficult in the first Part, because there is nothing of that Trouble of mixing the Cream, and preparing the whole for the Rennet.

When a Cheese of this Kind is intended to be made, the Housewife should tell her Milk People of it, and give them a particular Caution to be quick Home with their Pails; for the most advantageous Way is, to mix in the Rennet when the Milk is warm from the Cow: it is in this Case to be strained into a Tub, and the Rennet at once put to it in the Quantity before-mentioned. If the Milk be not warm when it is brought in, it must be set over the Fire to give it a little airing: but here a great deal of Caution is to be used, as to the Degree of Warmth: for a little Heat serves to make the Rennet take Effect, and the Curd separates the sooner for it, but on the other Hand, if the Milk be made too hot another Separation comes on, which is not intended in this Case, and this is the parting of the Cream from the Milk.

We see the Effect of heating Milk, whether in the common Way over the Fire, or in the Way for what is called scalded Butter, is always a raising of the Cream more freely and speedily: now this is not intended in Milk designed for Cheese, for we see on the other Hand, a great deal of Cream is added to the Milk in the former Method of making the new Milk Cheese.

This is named to caution the Housewife, that in following our Instructions for the Improvement of her Milk, she may not, by exceeding the Bounds, spoil all. Some Warmth is necessary for the Rennet taking its proper and timely Effect, but too much separates the Cream. We see that the Cream remains perfectly mixed in Milk as it comes from the Cow, and a less Warmth than this is sufficient for the giving Effect to the Rennet; therefore let the Housewife, whose Milk is not brought in warm enough, make it nearly as warm as when it comes from the Cow, it need not be quite so much, and while it is under this she is safe from doing any Harm.

When the Milk has been made of a proper Warmth, and the Rennet is in, 'tis to be covered up till the Curd is formed; and then the Cheese is to be made, in all Particulars, just as that before described; that being the general Method, we shall in none of the following Instances repeat it, but only refer

fer to it, unless when any particular Circumstance requires some Variation.

Having mentioned what is called the one Meal, we must add the making of the two Meal Cheese; this is a Cheese made of two Milkings mixed together, and the common Way is to mix the Evening's and the next Morning's Milkings for this Purpose.

In that Case the Cream is stirred into the Evening's Milk, and then the whole is mixed with the Morning's Milk: all this is warmed a little together, till nearly as warm as the Milk when it comes from the Cow, and the Rennet is put to it, it is then to be covered up, and the whole to be managed into a Cheese as before.

There is another Sort of two Meal Cheese, which is made by mixing the Evening's Milk after it has been skimmed, with the Morning's entire, and this also is easily enough made into a Cheese, by first warming the whole over a Fire.

These Cheeses differ in Goodness according to the Quantity of Cream that is in them, and they are all, in their several Degrees, inferior to the new Milk Cheese, described in the preceding Chapter. As that consisted of the Morning's Milk and Evening's Cream, it is the richest Cheese of this Kind. As to the others, the one Meal Cheese and the two Meal, are just equal in Goodness, when the Evening Milk is used with its Cream; but in this Case the Cheese is one Degree inferior to the other, as there the Cream of the Evening went to enrich the Milk of the Morning, without its own Milk. The third and poorest Kind is that made of the two Meals or Milkings, one of which has been skim'd. This reduces it toward the Condition of skim'd Milk Cheese; but however it is very superior to what is made of skim'd Milk only, because as that consists of the Curd of Milk wholly, that had lost its Cream, this is in Part composed of Curd with the Cream in the Milk, that of one Meal not having been skim'd. We shall add, for the Use of the poorer Farmer, and such as have Occasion for the most ordinary Cheese of all, the Manner of making it from Milk that has been skim'd entirely.

C H A P. XXVII. *Of skim'd Milk Cheese.*

WE have come down gradually from the best Kind of common Cheese to this, which is the poorest and the worst. It is to be made with some Care; and indeed the Ingredient is so poor, that without more Caution than is needful when

when there are better Materials, there will be no making it at all.

When the Milk of two or more Meals has been skimm'd for Butter, it must be poured into a Tub, and the first Thing is to taste it carefully, to find whether it begin to be sour, for on this depends the Manner of working it; if the nice and accustomed Taste of the Housewife cannot perceive any thing sour in it, she must put a Part of it into a Pot, and set it over the Fire, making it so hot that it shall be able to heat the rest thoroughly, to somewhat more than the Degree of Heat required in the preceding Directions.

In those Cases a richer Milk was used, so that there was Danger of raising and separating the Cream by too much Heat; but here there is so little that it is in less Danger of that Accident; and the Milk being poorer, is not so easily turned. It will require somewhat more Earning and more Heat for that Purpose.

This is the Method to be followed, if the Milk be perfectly sweet; but if on tasting it be found sour, or but inclined plainly to Sourness, it must not be set on the Fire, lest it should break: in this Case a small Quantity of Water is to be made thoroughly hot, and poured in to bring the whole to a due Degree of Warmth to receive the Rennet.

When the Rennet is in, the Vessel is to be covered, and after this the whole Process is to be repeated, till the Cheese is made in the same Manner as the former.

These are the several Cheeses made in common in all Places, and with which all Farmers should be acquainted; we shall now come to such as are more particular in their Kind, but most of them made to great Advantage.

C H A P. XXVIII. *Of Cheshire Cheese.*

THE Soil and Pasturage in CHESHIRE, and the adjacent Parts, are very favourable for Cheese; we have observed, on entering upon this Article, that some Soils and Pastures are more, some less favourable, but none so much, at least none more, than this.

To this happy Article, which they have from Nature, the CHESHIRE People add a particular Care in the making up of their Cheeses: otherwise there is not much particular in the Method, except what becomes needful from the great Size of the Cheese. We shall however lay down the whole Process, as we have obtained it from some of the greatest Dealers

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on the Spot ; that the Farmer elsewhere, in the like Circumstances, may know how to set about the same Undertaking.

Cheshire Cheese is a new Milk Cheese of a very large Size, made from a Milk, which the Food of the Cows thereabouts renders particularly excellent for that Purpose. There is nothing more in the Matter, and the Way in which they make it we shall deliver presently ; but first, for the particular Instruction of the Farmer, we shall acquaint him with their general Management of their Cattle.

The Time of the Year at which they make their fine Cheese, is from the Beginning of MAY to the End of SEPTEMBER : this they expect annually as the Season, and they manage their Milch Cattle accordingly.

In the Middle of APRIL they turn them out to Grass, and they make Cheeses as soon as they begin this feeding, but the first are not the fine saleable Kinds, nor are brought to Market. They are coarse, poor, and ill-tasted, and are all consumed upon the Spot. The Pastures are too rank at this shooting Season of the Year, and the Consequence is, that the Cheeses made from their Milk partake of this Rankness, and they have it not only in their Taste but in their other Qualities : far from being of that regular and firm Texture, the Cheeses made afterwards have, these lose their Shape, swell and become full of Holes, so that they are neither well tasted nor well looking. Nothing can be so unlike what we commonly understand by the Name of a Cheshire Cheese, as what is made in CHESHIRE at this Time of the Year.

This may shew that the Effect really is owing to the Pasturage, in those excellent Cheeses we have from CHESHIRE ; for we see, till the Pasture is come down from its own Rankness, it does not afford Milk fit for Cheese-making there.

The People are so sensible they are to expect this, that they use particular Cautions always at that Season : they always boil a Part of their Milk, which they do not at other Seasons of the Year ; but this does not answer their Purpose. However, as they are used to Cheese-making they begin at this Season, and so long as it is bad they keep it for their own Use ; nothing could inform them so well as Experience, when it becomes better, and finally, when it gets altogether fit for their Service in the great Way of their Traffick.

Some have attributed this Fault in the Cheese made early in the Year in CHESHIRE, to some particular Weeds ; and Horsemint has been named as the Principal ; but this is a palpable Error. Horsemint grows all the Summer, so that were it the Cause the Effect would remain. The whole Occasion

is the particular Condition of the common Pasturage at that Season. This in the rest of the Year particularly favours the Cheese, but it is now too rank; and we very well know in other Instances, as well as this, the best Things may be faulty when they are in Excess.

It is not only before the right Season, but after it, that the Cheese of CHESHIRE is bad; we have named the Time of the Year at which the fine Cheese of this County is made, which lasts only five Months: after this Period, though the same Care and Pains be used in making it, the Cheese grows bad again, and is not marketable; at least they do not carry it to Market, lest it should hurt the Credit of the Country: but they continue making it for some time, for the Use of their own People.

The Fault of the Cheese after MICHAELMAS, is of a very different Kind from that in Spring. In the Month of APRIL it is rank, and in OCTOBER it is poor. This is the greatest Proof that can be, not only that the Excellence of the Cheese of this County is owing to the particular Nature of the Pastures, but that this Article of Food to the Cattle is the whole Matter on which the Difference that good Dairywomen find in Cheese, in the several Parts of ENGLAND, depends. There is good Cheese made in SUFFOLK, and we see there is bad in CHESHIRE: but in general it is reasonable to conclude, that the Soil of CHESHIRE affords a Pasturage particularly fit, and that of SUFFOLK particularly unfit for Cheese.

We see the Progress of the Growth of Pasturage in CHESHIRE, marked exactly by the Condition of their Cheese. During the Summer, when that Food is in its regular and perfect Richness, Cheeses made there, though in the same Manner with those in other Places, excel those of any other Part of ENGLAND; but in Spring the Herbage is too rank, and they are destroyed by their own Richness, and in Autumn it is too weak, and the Cheeses grow poor.

As the People of CHESHIRE begin Cheese-making before the Pasturage comes to be good, they continue it after it is decay'd; and this with very good Reason, for they could not any Way else tell exactly when to begin, or just when to leave off. By this Conduct they do not lose a Day of the Cheese Season; and as to what they make before and after the Season of its Perfection, they have a Home Consumption.

When they are convinced there are no more of the marketable Cheeses to be made, they continue that Work only till they have made the necessary Provision for Home; then they

go to making of Butter, a great deal of which they salt, and this they continue till the Cows grow dry.

After this general Account of the Nature of Cheshire Cheese, and the Occasion of its particular Goodness, we shall give the Directions for attempting it in other Places, according to the Rules which are universally followed there; for in all the Country they have but one and the same Practice, and they very seldom fail in their Expectation, during the favourable Time of the Year.

C H A P. XXIX. *The Way in which Cheshire Cheese is made.*

IN laying down the general Methods of making Cheese in CHESHIRE, we must observe that there are in this, as in all other Things, some Differences; there are People in CHESHIRE, who make poorer Cheeses than others, but it is not to their Credit or Profit; and the Difference we observe in them, though in some Degree owing to the keeping, yet is also sometimes owing to the Condition in which they come from the Maker.

We have observed that the Cheshire Cheese is properly a new Milk Cheese. We have shewn, in the treating of the common Country Cheeses, that some make them with new Milk, enriched by the Cream of the last Milking, and others of new Milk, impoverished by an Addition of the skim'd Milk of a preceding Meal. In CHESHIRE their Pastures are so rich that they never find it needful to enrich their new Milk, for it will alone, with proper Management, make Cheese of the richest Kind that can be; but some of the CHESHIRE People impoverish their new Milk, by mixing the skim'd Milk of a former Meal, and this always debases the Nature and Quality of the Product.

This is the general Cause of the natural Poorness of such Cheshire Cheese as is inferior to the common Sort; but this is a Practice carried on by few. Having just mentioned this for the Sake of passing upon it a necessary Censure, we shall lay down that Method which may be called universal in the County.

They are in the first Place particular as to the Condition of the Cow: and this is a Caution that all Farmers would do well to take from them: they find by Experience, in this great Cheese County, that the Milk of a Cow which has just calved, is not so proper as that a few Days after; therefore they never

take the Milk of any Cow for Cheese till she has been milked four or five Times.

This Caution being observed they use their whole Store of new Milk, a very little excepted, for their necessary Uses, in the Cheese Manufacture. When the Morning's Milking is brought in, they strain it warm into a large Tub, and put in their Rennet. Four Spoonfuls is the Quantity they usually allow to as much Milk as will afford a Cheese of a Hundred Weight; and there are Dairies of such Consequence in that County, that they turn out two Cheeses of about this Size every Day, during the five Months they are in the right Season.

They cover up the Tub, and when it has stood half an Hour they open it, and find the Curd formed. They are very cautious to hit the right Quantity of Rennet, which no Rule can determine, because of the Difference in the Strength: for too little does not give the Curd a due Consistence, and too much makes the Cheese bitter.

After half an Hour they uncover the Tub, and press down the Curd with a large skimming Dish; and when they have pretty well cleared off the Whey, they get to work upon the Curd with their Hands, which they break to Pieces in the most perfect Manner, working it a long Time for that Purpose.

This done, supposing it for a Hundred Weight Cheese, they add one Pound of Salt: this they work in, and mix thoroughly well with the Curd.

This done, they put the Curd into a wet strong and large Cheese-cloth, and when they have got the Whey tolerably well drained out, they put it into the Vat, or Mould, for four Hours, with a good Pressure, putting the Vat in the Cheese Press, and working it down pretty strongly.

At the End of the four Hours they take it out, salt the Out-sides, put it into a fresh wet Cloth, and put it into the Vat, and that into the Press again: here it is to be kept four Hours more; and in the mean Time a Quantity of good strong Brine is to be made of Salt and Water, and put into a large Tub.

When the Cheese has been four Hours more in the Press they take it out, and put it into the Tub of Brine, and then let it lie eight Days, all the Time covered over with Brine, and turned once a Day.

At the End of this Time it is to be taken out, and laid to harden and dry. This is to be done in a particular Manner, and Preparation is to be made for it accordingly.

A Quantity of Rushes are to be cut up, and laid green on a large Board: on these the Cheese is to be laid when taken out of the Brine, and for the first Day nothing is to be done to it; the next Morning it is to be turned and wiped with a Hair Cloth all over; and this is to be repeated every Day for twenty Days.

At the End of this Time it must be removed from the Bed of Rushes, and laid on the Floor; and it is here to be taken up, and turned once in three Days, and at every turning it is to be rubbed till it gets firm and hard: as this is the completing the Work, it is to be done very carefully; for if the due Degree of Hardness be not given at this Time, the Cheese will be liable to Accidents in the keeping. Therefore it is an essential Point to let it lie long enough, and wipe it carefully.

When it is thus finished and hardened, the last Thing is the rubbing it over with some Butter, and this, though it may seem more trivial than the rest, is very essential: half a Pound of Butter is the proper Quantity for a Cheese of a Hundred Weight, and this should be rubbed thoroughly in all over it, nothing more tending to preserve the Rind in good Condition, and keep the Cheese sound.

This is the Method observed in that famous Cheese County. They have Rooms built on Purpose, in many Places, for the drying of their large Cheeses, and they raise the Floors several Feet above the Ground, to preserve them from Damp. In many Places they use Shelves put round these Rooms, instead of using the Floor, which I think much the better Method, for the Cheeses are more secure to be out of the Reach of Damp, and they are more easily turned, and more conveniently rubbed and wiped, which is very essential.

C H A P. XXX. *Of making Cheese like Cheshire, in other Places.*

WHAT I have written in the preceding Chapter, concerning the making of Cheshire Cheese, is what I have collected from those who are much concerned in that Product, and from what I have myself seen on the Spot: for I once, some Years since, made a Journey thither for that Purpose, and took Notes of every Circumstance, intending to attempt the making a Cheese of the same Sort.

Having thoroughly acquainted myself with the Method of working, I set about it at Home, employing the most careful Servants that could be had, and over-looking every thing myself.

The first Trial did not succeed; and I made another; after the second I made a third, and being very much bent upon the Thing, I repeated the Experiment oftener than a wise Man should have done; for I found in the End I had been trying to make Brick without Straw, my Materials not serving me.

I was not at that Time so sensible, as I am since made by Experience, that the CHESHIRE Manufacture depends, in a Manner, entirely upon the CHESHIRE Pastures. It was plain the Food was of great Consequence, and from the Failure of the Milk from one Pasture I tried that of another, and went the Round of all my own, and several of my Neighbours, but nothing would do. Some was too rank, and some too poor, but none came up to that excellent Richness of the CHESHIRE Kind.

This I have mentioned as a Caution to others: but there is no Need it should prevent their making some Trials, only let them learn from this Experience, not to venture so many.

There may be Grounds that will afford a proper Milk; but from such as do not, none can ever make this right Kind of Cheese.

Wherever the Farmer has upon his Hands a rich, short, and sweet Grass, with numerous Blades, a full Body in each, and few rank Weeds among it, there it will be worth while to make a Trial; not to let aside the whole Business of his Dairy for such Trial, but to make one Cheese. Let him give the Experiment fair play, by making it in the first or second Week in JUNE, which is the Time when the very best Cheeses are made in CHESHIRE; and having made this Trial with all due Care, according to the Rules we have laid down, if it do not succeed let him give up the Expectation: if it do he has the Opportunity of making a Fortune.

Others beside myself have tried with as little Success, in various Parts of the Kingdom; but all this proves is, that we have not yet found any Pastures like those of CHESHIRE; but that is no Proof we never shall.

The Misfortune of these Cheeses made in the CHESHIRE Manner in other Places, is that they will not keep their Consistence; and when that is lost they soon decay. The great Happiness of the CHESHIRE Pastures is, that they furnish a Milk which has at the same Time great Richness and great Firmness in the Curd, which are the two Articles whereon the Firmness and Fineness of Cheese depend.

C H A P. XXXI. *Of making Sheep-Milk Cheese.*

THE Reader who is unacquainted with these Subjects, will naturally enough suppose a Cheese made of Sheep's Milk must be a very poor one: but this is a great Error. They prefer in CHESHIRE the Cheese of the neighbouring Parts of WALES, to the very finest of their own, giving thirty per Cent. more for it, and this is all made of the Milk of Sheep.

It is particular in Sheep's Milk that it abounds in Curd; all Milk, as we have observed, consists of the three Parts, Curd, Butter, and the watery or wheyey Matter; but it is the particular Quality of the Sheep-Milk, that it affords most Curd in Proportion of any other Kind.

It is natural also to this Curd to be tender; but there are Pastures on which the Sheep yield a Milk as proper for Cheese, as the Cows of CHESHIRE. These are principally in and about the Borders of WALES. I have examined them with Design to tell the Farmer in ENGLAND which of his own are like them, and I can give him some Hope of Success in this Article, if he will think it worth while to attempt the Manufacture.

DENBIGHSHIRE is the particular County where Sheep Milk Cheese is fine; this is as famous as the Cheshire of ENGLAND. The Pastures on which the Sheep feed there are hilly, the Soil rocky, and the Grass low, but very thick and entirely free from rank Weeds.

We have the same or very nearly the same Kind of Pasture in some Parts of HERTFORDSHIRE; and the Farmer will know it by the Shortness and dark Look of the Grass, and by the little blue Bell Flowers, which are the principal Weed that grows among it. In these Pastures Sheep yield a Milk, the Curd whereof is firm, and therefore there is all the Advantage, and little of the Inconvenience attending this Species.

The Cheeses made of this Milk are extremely rich and mellow. They never have any great Degree of Hardness; but their Richness is always a great Recommendation, and another is their ripening very quick; for one of a moderate Size will be fit to eat in four Months or sooner.

This may very well tempt the ENGLISH Farmer to make a Trial, and the Price may encourage him farther. 'Tis a Cheese that in many Parts of ENGLAND brings from five Pence

Pence to seven Pence a Pound Retail; and might be set at a much larger Rate in LONDON.

We shall acquaint the Farmer with the Method of making it to Perfection; but shall first inform him what he is to expect by Way of Quantity from these new-fashioned Milch Cattle.

Five Ewes, upon a good Pasture, will give at the Rate of two Gallons of Milk a Day: upon an indifferent one they will give a Gallon and half: so upon this the Farmer may judge how many he will set aside for this Purpose of milking. He may count five Ewes as the same with one Cow, and he will not be much mistaken.

The Sheep are to be milked Morning and Evening, and when they are a little used to it will stand very quietly. The Milk of the Evening is to be strained into that of the Morning, and when the Milkers come in the next Morning, the whole is to be mixed with what they bring in. This is the Custom in WALES, where they make these Cheeses best; so that the Sheep Milk Kind is always what we call a three Meal Cheese.

When the Milk is all mixed, a little of it must be heated, and that poured into the rest to make the whole of the same Degree of Warmth with that which just comes from the Cow. Then the Rennet is to be strained in, and thoroughly mixed with it. As to the Quantity, it is to be about one fifth Part more than is used for Cows Milk.

The Vessel is to be covered, and stand quiet till the Curd is formed, and after that the Procedure is to be much the same with that on other Occasions. The Whey must be skim'd off, the Curd must be well worked in the Hands; and afterwards put into a wet Cloth and press'd, but this Pressure must be continued six Hours.

At the End of that Time it must be taken out, and the Cloth shifted; the Outside must be then salted, and it must be pressed six Hours more, the other Side being turned upwards.

While this is doing a Bed of Rushes must be made upon the Floor, and the Cheese, when taken out, must be laid upon it, and in this Manner it must lie a Fortnight, taking up and turning it every Day; and remembering every Time it is taken up, to rub it softly but thoroughly all over, with a dry and not very coarse Cloth. In this Time, drying gently and leisurely, it will get some considerable Firmness, for a Cheese of so mellow a Kind; and when it is thus far prepared, it is to be taken from the Floor and laid upon Shelves, where

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it will dry more quickly than at first, and be thoroughly finished.

This is the Method of making a Sheep Milk Cheese entire, and a very excellent and valuable Kind it is: but there may be a Sort made with Sheep and Cows Milk mixed, which will answer the Farmer's Purpose excellently in many Places, where his Pasture would not serve for the making Cheese from the Sheep-Milk alone.

There is a Season when the Sheep-Milk may be had in Plenty, and without Inconvenience: this is when the Grass Lambs are sold off fat: the Ewes will then yield a large Quantity of Milk, and that regularly for some considerable Time; they should therefore be milked, and the Produce mixed with the Cows Milk for Cheese. We have mentioned how Sheep-Milk abounds with Curd; and how fine that is in its Kind: being mixed with Cow's Milk, the Curd produced from both has the Advantage of each Kind, it gets Firmness from the Cow, and a delicate Mellowness from the Sheep.

This Curd is to be made into Cheese in the Way we have described for the new Milk Cheese, and it will excel any that is made of new Milk from the Cow alone. I have had Cheese of this Kind made upon my own Ground, and when it has come to my Table, some have taken for one Kind of foreign Cheese, some for another; and every impartial Person has declared it better than most Kinds.

C H A P. XXXII. *To make a Nettle Cheese.*

A Nettle Cheese is accounted, in many Parts of ENGLAND, a very dainty and excellent Kind; it is a very thin new Milk Cheese, with an exceeding fine and smooth Coat, that is the whole Matter. It differs from the common new Milk Cheeses more in the Form, and the Manner of making and drying, than in any thing essential in itself.

The Reader has observed that for the drying of the CHESHIRE Cheeses, which are large and thick, they use a Bed of Rushes spread evenly upon the Ground or Floor of the Room; and in the same Manner a Bed of common Nettles is the Matter on which these Cheeses are dried, and from which they receive their Name; the Nettles upon this Occasion are to be fresh cut, as the Rushes on the other; and the Manner of making the Cheese is this.

Let the Milk of the Morning's milking be taken for this Purpose, just as it comes in warm from the Cows, without any Addition or Mixture, for the enriching or impoverishing

it; or the joining with it the Milk of any former milking. Let this pure fresh Milk be strained through the straining Bowl into a large Pan, or small Tub, and let there be immediately added to it as much Rennet as will be necessary to turn it. 'Tis then to be covered up half an Hour; then the Curd is to be press'd down, and the Whey skim'd off, and when thus separated the Curd is to be wrought in the Hands. When it is well worked it is to be put into a Cheese Vat, not more than three Quarters of an Inch deep, and press'd to get out the Whey.

The very same Method is to be used that was directed for the new Milk Cheese, and by this Means there will be a very fine One-meal Cheese, thin and delicate, prepared, and ready for drying. It is then the Nettles come in Use. When it has been sufficiently press'd it is to be laid on the Floor, which is to be first spread over with fresh Nettles, and another Parcel of the same is to be spread over it.

Care must be taken in the cutting and laying of these Nettles, for the Cheese is to have an even Coat, and that will depend entirely upon the Management in this Particular. In the cutting then it must be observed, that only young Nettles are to be taken, or the tender Tops alone of such as are more grown; and these, when they have been laid evenly upon the Floor, must be press'd down, and flatted carefully into an even and smooth Surface: this is the essential Article whereon the Smoothness of the Coat of the Cheese depends; and if there be any thicker Stalks, they will take Effect upon the tender Surface of it, and even any rumpled Leaf will have the same Consequence. When the Bed is made flat and even, the Cheese is to be laid carefully upon it, and a Coat of the same Kind spread evenly over it. Every other Day fresh Nettles are to be brought in, and the Cheese is to be wiped and laid upon the new Parcel, covering it with fresh ones also. In this Manner it is to be kept till it is ripe and ready for the Table, and no Cheese ripens finer.

CHESAIRE Cheeses, which are large and thick, they use a Bed of Nettles, and in the same Manner a Bed of common Nettles.

C H A P. XXXIII. To make a running Cheese.

THIS is a greater Delicacy than the former, and is a richer Cheese, with the same Advantages of ripening; it is made thus. Mix together equal Measure of Stroakings of the Cow, and of rich Cream, put this in a clean Pan. Set it in a Pot of Water, that the Water may reach up on the Outside as high as the Cream and Stroakings do within;

and in the Manner of the preceding Chapter, for the curing of the Cheese, then

then set the Pot on the Fire, till the whole be as warm as Milk from the Cow.

Take the Pan out of the Water, and put in as much Rennet as is sufficient to turn it. Stir this well in, so that it may mix thoroughly; and then cover the Vessel.

When it is come, press down the Curd, and take off the Whey: then heat the Whey scalding hot and throw it upon the Curds, and after this take up the Curd, which will now be in a Body: this must be done carefully with both Hands; and the Curd is to be raised up as whole as possible without breaking it, and so laid into the Vat; then place it in the Press, and put a small Weight upon it; afterwards put on a larger, but don't bring it to the Screw Press, for it is too delicate for that forcible squeezing.

When the Whey is got out let it be taken out, salted a little, and laid upon a fine even Bed of Nettles. The Leaves of the Nettles stripped from their Stalks, should be used for this Purpose. It must be shifted as the other, and will be very ripe in three Weeks or less. Three Pints of each of the Ingredients make a proper sized Cheese of this Kind.

CH A P. XXXIV. *Somersetshire Cheese.*

THIS is a large and rich Kind of Cheese, named from the County whence it is brought, and where it is principally made. The Bigness is a very material Article, for I have seen the same Kind of Cheese exactly, made smaller, and it has been not at all particular, or scarce seemed of the Nature of the larger. What is farther singular in it is, that there is Butter worked into it, which greatly helps the Mellowness.

This is to be made thus. Let the Milk of twelve Cows be set over Night for Cream; and in the Morning let the Milk of the same Cows be brought into the Dairy warm from them. Let the Cream be carefully taken from the over-night's Milk, and mix'd with this Milk of the Morning: let all be strained together into a large Tub, and as much Rennet put in as will be sufficient to turn it. Let it be covered up for half an Hour, then open it, break and press down the Curd; separate the Whey, and when the Curd has been well worked in the Hands, to a Cheese of this Size there must be allowed three Pounds of fresh Butter. This must be well worked into the Curd with the Hands, and a little Salt sprinkled over it, and also worked in.

It

It is then to be put into the Press in a large wet Cloth, and it must be turned very frequently, every Time using fresh wet Linen, till toward the last, and then there must be three or four dry Cloths.

When it is put in for the last Time it must be somewhat firmer pressed than before, and it ought to remain in the Press forty Hours. When it is taken out of the Press it must be washed over with Whey, and laid in Cloths till dried. It is finally to be laid on a Shelf, that it may dry perfectly, and there must be turned very frequently, and every Time carefully wiped. It will, according to its Size, take a considerable Time in drying, but it will become in the End a very rich and fine Cheese.

CHAP. XXXV. *Of the early Use of Wool in the Eastern Countries.*

WE have shewn our Husbandman the proper Management and various Uses of Milk, the Produce of his Cows, and we are now to consider the Nature, Qualities, and most advantageous Uses of Wool afforded by his Sheep.

Wool has been considered at all Times as a most valuable Commodity; and that of our Country is preferable to most other upon the Earth. We find the Use of Wool known in the earliest Periods, and Flocks of Sheep are mentioned in the first Ages of Mankind, whether we read of them in Sacred or Profane History. Kings and Lawgivers have not been ashamed to employ themselves in the Care of them; and therefore the Country Gentleman needs not think their Wool an Article beneath his Dignity. We wish to make a Regard to it more universal, and shall endeavour to render the whole Knowledge of it familiar.

We read in Sacred History that the Patriarch ABRAHAM had Flocks, and the ISRAELITES of that early Time all employed themselves in the Care of them: their Neighbours the MIDIANITES had such Numbers at that early Period, that the ISRAELITES took among the Spoil after their Success against them, more than six Hundred Thousand; and drove to their own Lands: and two Hundred and fifty Thousand were taken from the HAGARITES by the Sons of REUBEN.

The ÆTHIOPIANS had Sheep also; for when ASA conquered a Part of their Country, he carried away Sheep in Abundance: the ARABIANS at the same Period had also Sheep, for they brought more than seven Thousand Rams at one Time to JEHOSEPHAT; and the MOABITES must have bred them

them also in great Numbers, for MESHU, King of that Country, rendered to the King of ISRAEL a hundred Thousand Lambs, and a hundred Thousand Rams.

These are Passages of History delivered in the several Parts of the Old Testament, according to the different Circumstances that introduced them; and by these we find that at this remote Time, much earlier than the utmost Extent of any other History, that the ISRAELITES had Sheep in great Abundance, and that the MIDIANITES and HAGARITES, the ÆTHIOPIANS and the ARABIANS, and the MOABITES fed them also in vast Numbers.

Here therefore is an Account of Sheep bred and tended in a Manner all over the Eastern Quarter of the World; and we have occasional Mention also of the same Creatures making a chief Object of the Care, and a principle Article in the Riches of the AMALEKITES, the PHILISTINES, and the People of DAMASCUS.

These are Countries whose Extent and Situation are very well laid down by the Labours of the Learned of later Times, and by this we see a great Part of the Quarter of the World, then most inhabited, devoted to the Care of this useful Animal.

That this Creature was bred not only for its Flesh, which some have very idly pretended, is evident also from many Passages. The Mention of Wool is made in some of these, and in others there are Allusions to the Implements of Weaving, which though they may be applied to either the weaving of Woollen or Linen Cloth, yet as Mention is in the same Books made of Wool, and of the Methods of preparing it for the Loom, they must be allowed often to refer to this Article.

That the ISRAELITES themselves fed Sheep for the Wool, may be seen by the Tythe exacted on it. In the eighteenth Chapter of DEUTERONOMY, the first of the Fleece of the Sheep is declared the Due of the Priest: and that other Countries knew its Value in the same Manner, is plain from an Instance in the Present of the MOABITISH King before-named, which is, that the Rams were given with their Wool.

The Staff of GOLIAH's Spear is said to be equal to a Weaver's Beam: the Fullers Field is mentioned in ISAIAH and by the Prophet MALACHI; and EZEKIEL, in the twenty-seventh Chapter, calls the People of DAMASCUS Merchants in white Wool.

We have recited these Passages, which contain the Summary of what is said concerning Flocks of Sheep, their Wool
and

and its Manufacture, in the Scriptures, to shew that the sheering of Sheep, the Use of Wool, the manufacturing it into Cloth, and the preparing that Cloth by fulling, were Articles known in the earliest Time. It establishes the Care of this Animal, and the Use of its Fleece, upon a very great Authority of antient History: it produces Examples that may animate private Gentlemen to interest themselves in the Care and Management of its Fleece, and Kings and Legislative Powers to establish and encourage the Manufacture of it. This Attention both of private Persons of Fortune, and of the publick Authority and Regard, is greatly wanting at present in **ENGLAND**, for the Advancement of our Woollen Manufactures.

It has been said that **GREAT BRITAIN** and **IRELAND** naturally were the Resources of the rest of the World for Wool; but this has been a fond Mistake, and has led the Publick into a Neglect of that Concern, from which it will not be easy to recover.

We have shewn here that Wool was produced in Abundance, and wrought into Cloth for common Service in the whole Eastern Part of the World, before any thing was known of **BRITAIN**; and we have found by Experience of late Time, that there are many other Countries in **EUROPE** which may rival us, if we neglect the Care, or our Legislature the Encouragement.

It is leading the Husbandman into a false Calm, to make him imagine that the natural Quality of **BRITISH** Wool is so superior to that of other Countries, that he may manage as he will, and it will still have the Preference. Other Nations have been eminent in this Article before **BRITAIN** was attentive to it. We know not whether this Island was peopled at the Time of the earliest of the Transactions above-named, in which Wool is mentioned so importantly; and even long after, when the enterprising Genius of the **PHOENICIANS** pushed their Navigation and their Traffick hither, this Commodity was not known amongst our People.

They traded hither for Tin, which they purchased on the **SEILLY** Islands near the Land's End in **CORNWAL**, then called the **CASSITERIDES**; and as they came hither on that Account, they took of those early **BRITONS** also all that they had to offer in Commerce. The several Articles are named, and Wool is not of the Number. **STRABO** has committed to Posterity the different Commodities: they were beside Tin, the great Article which brought those remote People hither, Lead, Corn, Cattle, Gold and Silver, also Dogs of a particular Breed, the old and famous **ENGLISH** Bull Dogs; and what

what comes nearest the present Article, Hides. These were the several Articles furnished by the BRITONS, and we see they had a Market for whatever was the Produce or Manufacture of their Country, but they never brought Wool to the Traders, though they sold them Hides. Therefore we see that BRITAIN, far from having at all Times supplied other Nations with Wool, was a Country that late fell into that Concern; and that there were Manufactures of Woollen in the Eastern Countries, and probably in many others, before the Use of the Fleece appears to have been known in this Island.

This is not wonderful, because the Inhabitants of a great Part of the Kingdom went naked, and those who covered themselves with any thing used the Skins of Beasts, in a rough and savage Manner.

As we have here shewn from Sacred History, that this was the State of the Case, we shall, in the succeeding Chapter, shew it appears also in the same Light from other Authorities; and from that we shall deduce the Lesson of Industry, Care, and Application to the Affair of Wool, for the Service of all concerned, from the meanest Farmer to the Sovereign. It appears that other Nations were acquainted with this valuable Commodity before it was known in BRITAIN: they may therefore supplant us in all Places, as they have in many, in this Article.

Our Husbandman has it in his Power to raise his Woollen Manufactures, under the Encouragement of the Government, to a greater Perfection than other Nations: this is the Advantage of our Country, let us not suppose we have more than we have, but knowing the true State and Limits of our Pretensions, let us use every Method to improve them.

C H A P. XXXVI. *Of the early Use of Wool in other Countries, according to general History.*

ALL the old Historians mention the Care of Flocks, and Value of their Wool: the GREEKS, of all the Periods we know, used it for the Purpose of Cloathing, and they refer to Times much earlier than their own, as familiar in the same Use; the famous TYRIAN Purple was employed in dying woollen Cloth; and the early Expedition of the ARGONAUTES to COLCHIS, for what was called the Golden Fleece, however it hath been represented, was no more than a Voyage of Traffick in Search of this Commodity. The Naturalists may suppose their Voyage was in Search of Gold, and the Adept

Adepts pretend that the Secret of the Philosopher's Stone was couched under this Mystery: but plain Reason, and the most authentick Accounts of the Transaction, taken in their plainest Sense, say nothing more than this; that the People of COLCHIS understood the Management of Sheep, and the manufacturing of their Wool, better than any other Nation of that Time; and that JASON, and his Partners, in that Expedition, after encountering many Dangers at Sea, and in their first Intercourse with them, brought back a Quantity of the Wool, and a Number of the Natives to manage the same important Article in their Country.

The City of CORINTH became afterwards a general Mart for Wool and woollen Manufactures, and therefore all Commodities in general: and after POMPEY had scattered the Pirates, the same Article was a very considerable Branch of the Commerce carried along the Coasts of the Mediterranean Sea.

In all these Ages, while so considerable a Traffick was carried on with Wool and woollen Cloths, in the several Countries we have named, nothing was known of BRITAIN. The Knowledge the PHOENICIANS had of our Country was lost; and they had never communicated it to any other People. This Island subsisted as a Place separated from the whole World, and unknown to all its Inhabitants; and the Histories, such as they are, that give an Account of BRUTE the TROJAN, and his Descendants, their Wars and Victories, mention not a Word of this important Article.

Our Ancestors, somewhat more civilized in those Ages than they had been in the preceding, might, for aught we know, have begun to manufacture Wool: that they might do so is all that can be alledged, we do not know they did; and of this we are very certain, which is the main Point concerned in this Place, that if they had the Knowledge of it, they served none but themselves; they had in these Ages no Commerce with the rest of the World, that was supplied one Country by another; and we see abundantly the Error of those who fancy this Island the natural Source of that Commodity.

We not only know that other different Kingdoms at that Time were famous for their Production and Manufacture of Wool, but we are told of several of them by Name. The same accurate and faithful Writers who give an Account of the Commodities of BRITAIN in those early Times, and do not name Wool among them, name that Article as a very valuable and first Rate Commodity in respect of others. SPAIN

is mentioned with great Commendation, in respect of the Wool it produced in those early Times, and the Manufactures made from it: insomuch that some attribute the Invention of weaving woollen Cloth to the People of that Nation. Wool was received in the early Times from many Parts of the Euxine; and the Trade of the Baltick was, in a great Measure, supported by it. The ARMENIANS of the same Period purchased Wool and woollen Cloths of the TURKS, in Exchange for Horses. ROME in somewhat later Times, received woollen Manufactures from ALEXANDRIA. This all stands established on the best Authorities, and is related by all the Authors who have, in any Part of their Works, had Occasion to mention the Commerce of those early Ages. In all those Times BRITAIN continued negligent of this Matter, as is evident from the Silence of all those who mention the woollen Trade of other Nations, among the most considerable Articles of their Commerce; and say nothing of it in respect of this, when they treat of the Product of it, and the Traffick carried on by them.

It will be seen, in the succeeding Part of this Work, how valuable a Part of our natural Advantage we neglected in this Article; and we shall, I hope, be cautioned not again to lose so great a Benefit, which so many others have, at different Times, taken from us, and will always be ready to take from us again, if our own Assiduity, and due Support from the Government do not prevent them.

C H A P. XXXVII. Of the Wool of different Parts of the World, its Condition and Qualities.

IN the Countries that lie far North, the Wool is generally coarse and of little Value.

In ICELAND it is as coarse as Hair, and in small Quantity. In NORWAY the Wool in general is but poor, though there is some tolerably good; that of their natural Sheep is short and coarse, and such as they bring over from other Places often die in the hard Winters. They work it up into Manufactures at Home, but they are of the poorest Kinds: their Cloth is little better than Flannel, and the principal Use of it beside is in a coarse Kind of Knit Stockings, which they not only make for themselves, but for Exportation to the other Northern Countries, to the Amount of sixty Thousand Pairs a Year.

In SWEDEN the Wool is also very coarse, short, and poor: they have been used, till of late, to have their woollen Goods from

from us, but they have since encouraged Manufactures so far, that they have a coarse Cloth of their own Fabrick, and to promote the Care of this Branch of their own Trade, a Duty is laid on the ENGLISH.

In MUSCOVY they have Abundance of Sheep, but their Wool is not fine.

In POLAND they have some Wool, but it is not excellent.

GERMANY, in many Parts, abounds in Sheep, and their Wool is fine, and the People understand very well how to make the best Advantage of it.

In the AUSTRIAN NETHERLANDS there is Abundance of fine Wool, and many of the Woollen Manufactures have been either invented or improved to a great Height there.

FRANCE is not famous for its Wool, though some in the Southern Provinces is very fine, but they import a great deal, and to our great Disadvantage, from ENGLAND, among other Places; working up our own Produce to supply other Markets in our Stead.

SPAIN produces a good Quantity of Wool, and it is the finest in the World: we err in supposing that of our own Country excels all others; this is an Instance of the Error, and there are several others.

PORTUGAL has Wool also little inferior to the SPANISH: it is fine and delicate, and fit for the nicest Works.

ITALY affords so much Wool that a great deal is annually exported, and it is very good: the VICENTINE and PARMAN in particular are famous for a fine and valuable Kind.

In HUNGARY and TRANSILVANIA there is a great deal of Wool produced, though not of any particular Excellence, so that it is less sought by Strangers, and in general it is worked up at Home.

In TURKEY they have Abundance of Sheep; and they carry on a considerable Traffick in Wool.

In SCOTLAND a great deal of good Wool is produced, though not equal to that of ENGLAND. In GALLWAY, TWIDALE, and more North, they have what is very fine, and they understand it very well. They had the Art of making Broad Cloth in great Perfection before the Union. The GLASGOW Plads exceed all other Manufactures of that Kind, and they have many other very good ones. There is a Method in the dying the red Part of these Manufactures, which the Scots have the Address to keep to themselves, and which keeps them the Pre-eminence in that Manufacture, though all the Arts possible have been used by our People to discover or purchase the Secret. The Scots are more honest than

our People of the same Rank ; it would not have been easy to have kept a Secret of that Importance in ENGLAND, which was necessarily entrusted to so many People.

In the East they at present less regard the Produce of this Commodity ; because their principal Manufactures are in Silks and Cottons, but there is a great deal of very fine Wool in ASIA, SYRIA, and PERSIA. They have a particular Breed of Sheep in this last-named Country, whose Wool is long and greyish, and they make certain peculiar Manufactures of it, and those much esteemed.

In CHINA and the EAST-INDIES the Produce of Wool is so great, that they shear their Sheep three Times a Year : and in AMERICA they feed Abundance of Sheep, whose Wool, in many Parts, is little inferior to that of our own Country.

C H A P. XXXVIII. *Of the managing Wool in different Parts of EUROPE.*

THE FRENCH, who very well know where the best Wool is to be had, get what they can from ENGLAND, not a little from SPAIN, and purchase it wherever good is to be had in other Places. The foreign, as well as their own, they divide into separate Parcels, according to the Degree of Goodness, before they work it up or dispose of it. Most other Countries have the same Practice, and from their dividing it into three Kinds this is called the Triage of Wool.

These three Kinds are called, in all the modern Languages, the first, the second, the third Kind of Wools. And when the Fleece is sold entire, there is usually made a Distinction, according to its Quality, into a first or a second Kind, the fine and the coarse being distinguished by these Names.

The Proprietor has his Choice to sell his Wool in the Gross, as it is shorn, or to clean and separate it ; and in general the best Method is to manage every Commodity as well, and work it as far as the Knowledge or Convenience of the Husbandman will permit ; for those who buy Things in the Rough, as they call it, always make themselves large Allowances for Waste and Labour in the working. In many Articles the Difference between selling the Produce in this rough Way, and selling it wrought, so far as the Farmer can conveniently do it, is Thirty per Cent.

The Wool of SPAIN is principally from CASTILE, ARAGON, and NAVARRE, and of these the first is generally the finest. It makes an admirable Mixture with our ENGLISH Wools. Those of FRANCE are, by all Acknowledgement,

ment, greatly inferior to ours; yet they by a proper Mixture of the SPANISH, and a good Fabrick, have produced Cloths very little inferior to our own, when we have kept our Wool entirely from them. Our People should in this learn of their Neighbour's Policy.

In SPAIN, where they are very choice of their fine Wool, they have five different Ways of selling it; and the ENGLISH Farmer should observe the Difference for his own Information. They sell it, sometimes singly on the Sheep's Back; secondly, Coarse as shorn; thirdly, Washed, cleaned, and triaged; that is, separated into the finest, second, and coarser Kind; and fifthly, On the Sheep's Back at a general Price, to pay for one Pile what other Piles of the same Quality shall be sold for. They generally find the fourth Way the best for the Seller, and the fifth the best for the Buyer. 'Twas once a Custom in ENGLAND to sell the Wool in this Way, but our Farmers are grown wiser, and we hope they will continue to be so.

The Difference in Quantity between the Wool as it is shorn, and when washed and cleaned, is about one half: sometimes the Waste is a little less, sometimes a little more, but usually about this. The second Cleaning which prepares them absolutely for Cloth, reduces them near a fifth; and this is the whole waste in general Terms.

This will inform the Farmer upon what general Conditions he may set the Price of his Wool, if he chuse to Part with it rough, but it will in this, and all other Articles, always be his Interest to Work them as far as he can himself: this is so universal, that he should understand it as repeated under every Article.

Upon the whole, having looked into the Produce of the Wool of different Countries, we shall do well to consider the Nature of their Pasturage, and other accidental Things of every Kind, that the Farmer may see not only where the best Wool is produced, but form some rational Guess to what the Excellence is owing.

In general two Things contribute to the Fineness of the Wool, the Sweetness of the Pasture and the Cleanliness of keeping.

In SPAIN, where the Wool is excellent, the Grounds are in a Manner barren, in Comparison of those in many other Countries, and in many Northern Nations we have mentioned as producing indifferent Wool, the Meadows are covered with a very rich Grass: but then the little Grass of SPAIN is sweet, and this abundant Quantity of the Northern King-

doms

doms is harsh and sour. A coarse Grass makes a coarse Wool; and to this we may attribute the ill Success of those several Schemes which have been practised, of carrying the Sheep of Wool Countries into others not famous for that Produce; the Kind is not of so much Importance in this Matter, as the Nourishment; and the same Sheep in a sweet Pasture will yield the finest Wool, that will afford but indifferent on a coarser Grass.

The practical Rule to be drawn from this is, that the Farmer who has a Mind to raise the Credit and Price of his Wool, should first chuse a proper Breed, which we have sufficiently directed under the Article of Sheep, and then feed them principally, if not entirely, upon his sweet high Pasture Grounds.

Cleanliness is the next Article, and this follows the other in Course, for the Sheep on Downs are always much cleaner than those in low Grounds. The FRENCH cannot be so careful in this Respect as we may, because the Fear of Wolves renders it necessary for them to house their Sheep in Winter; and in this Case there is no Possibility of their living so sweet and clean, as when they went on in an open Pasture, and touch nothing but the Grass washed with the Dews of Heaven.

Our covered Fold for raising Manure from the Dung and Urine of Sheep, will be little Disadvantage to their Wool, if the Earth thrown into it be of a sandy or dry loamy Kind, and none answers that Purpose better.

C H A P. XXXIX. *Of the Original of the Woollen Trade of ENGLAND.*

WE have seen how late, in Comparison of other Nations, the People of BRITAIN fell into the Care of Wool, and the manufacturing of it; and we shall find, upon farther Enquiry, that by all we have remaining on the Subject, the Progress made in it was at first very slow.

This is the more to be lamented because we have, and always had, the finest Pastures in the World. The improved State of Husbandry has, from time to time, brought in new Advantages to tilled Land, and none more than the latest; but at all Times the Pasturage must have had its Character of Excellence and Superiority, nay, probably in the Times when Agriculture was least improved, that Part of our Produce was best, because then the best Lands lay for it. Grass is a Product of Nature, in which she needs no Assistance from the Hand of the Labourer, or Genius of the Husbandman: her

own Hand plants the Growth, and the Rains of Heaven are all it needs for bringing it to Perfection.

There never was any Time therefore in which this Country wanted the Means of feeding Sheep, and consequently there has been no Time when it might not have produced Wool in Abundance: we have the same Advantage over all other Countries in the World, at this Time, in respect of our Pastures, and let the Husbandman well regard it. Let him remember how many Ages other Nations, as we have shewn him in the preceding Chapters, ran away with the Profit of this great Commodity, before his Ancestors in this Island thought of interesting themselves in its Concern; and let him recollect later Instances in which they have, and in which, I am sorry to say, they do rival us through our Neglect: what Advantage they had before the BRITONS entered on the Trade they may have again, if it be neglected on one Hand, or restrained by Authority on the other: and let these Considerations have their Effect in the stirring up all Ranks to promote and patronize it.

If we would know by what slow Degrees the Care of Wool, and the Profits rising from it, became known in ENGLAND, we must refer to those Records in which it has been occasionally named, or in which any thing concerning Sheep is to be found; for we are not to expect that we shall, in any early Time, find an Account of a Trade established on this Article.

We have shewn that the Generality of our Ancestors, in early Time, went naked, and that Skins were the Covering of the rest; in the Time of the ROMANS Commerce became more established in this Island, and LONDON was a Place of great Traffick; Wool was not of the Number of the Articles in which either our own People, or the ROMANS settled among them, traded.

One of the earliest Notices we have of Sheep in BRITAIN, considered with respect of their Value is found in STILLINGFLEET *, who tells us, That between the Years seven Hundred and twelve, and seven Hundred and twenty-seven, were made certain Laws of King INA, and in those a Value or Price was set upon the Sheep Kind. The Price of an Ewe and her Lamb together, till a Fortnight after EASTER, is there set down at One Shilling. The Value of Money was then very different from what it is now, but this, with all the Allowances that can be made on that Head, is but a very poor Price.

We may learn by it that in King INA's Time the Care of
Sheep

* *Chronicon Pretiosum*, p. 20.

Sheep was grown to some Concern in the Island; and there are other Passages of the same Period, that shew Wool was an Article comprised in the Purchase of these Creatures; but by all we learn on this Head, the Art of working it was but at a poor Height, nor was any of it exported either wrought or raw.

ALFRED, a Name famous for Military Atchievements, and also for the Care of Arts and Commerce, took no small Pains to improve this Manufacture; but they did not much succeed; 'twas in the Year 885, he set in earnest about this great Work, but Wolves were too numerous in the Island to let Sheep be kept in Safety.

The Consequences of the Encouragement this Sovereign gave to the raising these Animals, was seen in the succeeding Years; for in 918, EDWARD, who had married the Daughter of a Country Gentleman, distinguished by the Regard he had shewn to this great Concern, and thence called by those who little understood what they read in early Writers, a Shepherd, had his own Daughters instructed in the Art of carding, spinning, and manufacturing Wool.

This double Patronage bestowed by EDWARD, the Countenance he gave to one who employed himself in breeding Sheep, and the Example he set in making his Daughters work Wool, was of so much Assistance to the Manufacture, that the Pasture of the Southern Counties became mostly occupied in feeding Sheep, and every one, fond of recommending himself to the Royal Favour, became a Shepherd, or at least employed his Attention greatly on that Article.

The Wolves were for some Time the principal Obstacle to the Progress of this great Undertaking; but after many Struggles with this Inconvenience, EDGAR, about the Year 961, setting a Price upon their Heads, and by every other Means encouraging their Destruction, three or four Years did the Business: there was not in that Time a Wolf left in the Kingdom.

The Value of the Sheep rose in Proportion to the Number propagated and preserved: for with the Encrease in the Quantity of Wool, the Demand for it enlarged. The same Author who tells us that in 720, in the Time of INA, an Ewe and her Lamb together, were valued only at a Shilling in the best Season, shews us that in 1000, under the Reign of ÆTHELRED, a Sheep alone was worth a Shilling, without any Restraint of Season †. This Shilling was SAXON Money.

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† *Cbron. Pretiosum*, p. 81.

This shews that the Value of Sheep rose, but it also shews that it was but slowly. No Exportation of Wool, or woollen Cloth, is yet heard of in the Market at Home; and People principally wrought up the Produce for the Service of their own Families.

A Hundred Years after we find by an accidental Passage, that the Value of Sheep was rather decreased than encreased, so that we may see the working up the Wool did not thrive very fast. The black Book which contained the Taxation of every Man, toward the Support of the King's Household, there mentions Money as an Equivalent for Cattle, and the Sum on each Article is stated. Ten Years before this Time we find, that if a Sheep was lost, the Damage was estimated at Five-pence, but on this Occasion the Price laid upon him who chose to pay his Tax in Money, instead of Cattle, was only Four-pence in the Place of One Sheep.

Pursuing this Subject in the old Records, we find the Sheep more numerous in all the succeeding Reigns, and we see their Value encreasing constantly with their Number. In the Time of HENRY the First, about the Year one Thousand one Hundred and Twenty, forty Sheep were valued at one Pound.

In one Thousand one Hundred and Eighty-five an antient Record tells us, that by the Custom of BELESHAL, the Tenants of SHERBORN were, on certain Occasions, to make their Acknowledgment by delivering a Ram, but if they chose to pay in Money, the Price was fixed at Eight-pence.

The Reader is not to imagine that this Price established upon Sheep, had Regard to their Flesh for Food, without Respect to the Wool: it is true that all Historians are silent upon the Progress of that Commodity and its Manufactures, but we have, a few Years thereafter, a memorable Instance of the Regard shewn to it as a National Commodity.

RICHARD the First, in the Year one Thousand one Hundred Ninety-three, returning from the Holy War, was taken Prisoner by the Duke of AUSTRIA. A vast Ransom was required, and toward raising it one Year's Wool was demanded from two of our Abbeyes. This is a Passage recorded by RAPIN *, and all the common Historians, and is supported on the best Authorities: and this shews, though we have not had any regular Account transmitted to us of the Progress of this Article of Commerce, that all the Time the Price of Sheep was encreasing the Value of Wool was rising,
and

* *Rapin's Hist. of Eng.* v. 1. p. 254.

and that this was the principal Cause of their Encrease in Value: and we find that at this Period Wool was become the first Commodity of the Island: the Thing next named in Purchases to Money.

Till this Time we hear, as I have before-observed, nothing of any Use of Wool, except for our Home Consumption, but this Transaction seems to have opened the Eyes of the neighbouring Nations. Having received ENGLISH Wool in Payment they found it excellent, and they began to think of it as a Purchase. The Pastures of BRITAIN now shewed the World their Excellence for the feeding this useful Animal, and the Husbandmen began to acquire a Reputation for its Management. Exportation of Wool became a common Practice, and the Article from this Time grew so important, that it was the great Source on all Emergencies. It was the Land Tax and the Malt Bill of those early Periods.

The first Notice of its Exportation is in the Year one Thousand one Hundred and Ninety-eight, only five Years from the Time of RICHARD's Ransom.

In this Year we find, in MADDOK's History of the Exchequer, that GERVASE DE ALDERMANBURY*, rendering an Account of the Chamberlainship of LONDON, gives in this singular and important Article: Fines from Merchants for Permission to export Wool and Leather Twenty-three Pounds twelve Shillings.

At the same Time that Quantities of Wool began to be exported, the manufacturing of it at Home encreased. The same Exchequer Account gives a List of several Sums by the Sale of Wool at Home; of twenty Pounds from one Person, and of two Hundred and Twenty-five Marks from the Seizure of a Quantity that was attempted to be smuggled out of the Kingdom, or exported without paying the Fine for Leave.

This is an Article recorded in the same Author, and it tends very happily to the shewing the real Price of Wool in ENGLAND at that Time.

The Quantity of Wool seized on this Occasion was forty-five Sacks. Each Sack we find was valued at five Marks, and each Sack contained twenty-six Stone of Wool. This settles the Price of Wool in ENGLAND, in the latter Part of the Reign of RICHARD the First, at little more than Two and Six-pence a Stone. This Two and Six-pence was, at that Time, one Eighth of a Pound Silver, and was equal to

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about

* *Maddock's Hist. of the Exchequer*, p. 532.

about three Times that Quantity or Weight of Silver now; that is, to seven Shillings and Six-pence.

The Reader will, we hope, not blame us for descending to Particulars in a Point of this Curiosity and Importance. We shall endeavour to trace the History of this Commodity from the best Records of earlier Time, and shew him its Advances and Decline under the different Encouragements or Oppressions of its Manufacture.

About thirty Years after the ENGLISH found the Way of serving their Neighbours with our Wool, we improved so far in our own Manufactures of it, as to get into the Art of dying. At first Wool was only wrought up in a coarse plain Way for the Cloathing of the Farmer and his Family: by Degrees those who best understood the working of it up, brought what they had to spare from the Service of their Family to Market; but all this Time the Wool was only wrought up as it was furnished by the Sheep, and all Cloth was of the same Colour.

They found that those who imported Wool and woollen Cloth from us, in its natural Colour, dy'd it at Home; and they soon learned the Art of doing the same here. We read in the Statute Book, that in the ninth Year of HENRY the Third, dy'd Cloth was limited by a certain Law, as to its Quantity and Measure.

Our Wars with FRANCE, and other Difficulties, broke in upon the Progress of our National Trade in 1242. the Persons and Effects of the ENGLISH Merchants in FRANCE, and those of the FRENCH Merchants in ENGLAND, were seized in Consequence of Hostilities between the two Nations; and in 1275. all Commerce was prohibited between ENGLAND and FLANDERS, upon a like Account; but upon this Occasion we find an Instance of the great Height to which the Wool Trade of ENGLAND was arrived at that Time, for a few FLEMISH Merchants were permitted to carry over a Quantity of ENGLISH Wool with them, paying the King for the Permission. This Quantity was no less than a Thousand and Sixty-eight Sacks, and the Price for Leave of Exportation was ten Shillings a Sack. We see by this how swift a Progress the Commerce of the Kingdom, in this Article, had made, when the Husbandmen understood the Value of the Commodity, and the Legislature encouraged its Manufacture.

We find by the Accounts here given, how little Historians and others have considered this important Article. Those who speak of the Manufacture of Broad Cloths in ENGLAND, follow

follow one another in placing the Time of their being first made at the Year 1331. We see from this Circumstance, countenanced by the Statute Book, an unerring Guide, that they were not only made but dy'd so early as in the Year 1220, one Hundred and Eleven Years before that Time; and probably the Origin of the Manufacture was much earlier than that.

The Quantity of Wool our Country produced soon after, is to be guessed from the vast Exportation we have named under those FLEMISH Merchants; and this as recorded punctually by RYMER *.

In 1284, foreign Merchants were permitted to establish themselves in the Kingdom, for the Encouragement of the woollen Manufactures. They had till this Time been obliged to lodge in the Houses of our own People, and could not trade otherwise than by making their Landlords their Brokers; but now they were permitted to traffick in their own Names; and the Privilege granted to them was of the utmost Benefit to the Trade.

In 1291, SANDWICH in KENT was made the general Market, by an Act of EDWARD the First, and so vastly did the Trade encrease, and the Manufacture flourish, that but five Years after this the Custom upon it was raised from twenty to forty Shillings a Bag, and the Traffick was able to support it.

This Demand was indeed repealed, but not because it would have ruined the Trade, but because it was made by the King's sole Power. That was a Stroke too arbitrary for those Days of virtuous Liberty: the Merchants exclaimed against it, and they obtained a Release from the absolute Exaction, the additional Duty being charged by this Act upon them with such Limitations, that it was in a Manner dependent on their Pleasure; and soon afterwards it was left to the Determination of Parliament.

A few Years after this we find the Traffick for Wool and woollen Manufactures very flourishing in LONDON, and several of the Sea Port Towns: the King's Duty upon exported Wool was established upon it according to the Weight; and the Scales for weighing it in all Parts were made by those in LONDON, and delivered in a solemn Manner by the Lord Mayor into the Exchequer, to be sent to their respective Places.

In 1297, the Wars with FRANCE demanding a great Supply, the woollen Trade was so flourishing that Recourse was had

* Rymer, vol. 2. p. 50.

had to it. The Parliament granted for two or three Years forty Shillings a Sack upon Wool. This was the Exaction that had occasioned so much Disturbance at first; but now it was legally established and regularly paid. The King promised never to demand more than the old Duty, without Consent of Parliament; and the woollen Trade flourished under this large Drawback, and the Disadvantages of a War together.

These were Times of virtuous Government. The King was thankful to his Subjects for so large a Supply, and he was happy to find that the woollen Trade could bear it: but he demanded it no longer than it was required by the Exigencies of the State, on Account of which it was raised. He called a Parliament, and of his own free Accord gave up the additional Duty, publishing a Proclamation that no more than the old Sum should any where be demanded.

The Price of Sheep now naturally rose with the Value of their Wool, but still the Number made some Alteration. We read in THORN * of three Shillings apiece being given for three Hundred Sheep; but it was at an Installation Feast, 1309. The current Price about that Time was much less, as we find in the Acts of the Common Council of LONDON, and in DUGDALE.

In the Year 1315, we find the Price of Sheep established in such a Manner, as to give us a fair Insight into the Value of Wool at that Period. The Sheep, if delivered shorn, was fixed at Fourteen-pence; if unshorn at Twenty-pence †, but we must not extend this Consideration farther than to the Value of the Wool, for it was a Time of Famine.

From this Period the woollen Trade became an Object more than ever of the publick Concern. Persons of all Nations who could improve the Manufacture of Broad Cloth, were encouraged to come over; and among Numbers brought under great Encouragements from FLANDERS, BRABANT, and ZEALAND; there were some so worthy of the Advantages they received, that they soon set the Trade upon a most respectable Footing Abroad, and upon the most profitable Foundation at Home.

In Consequence of the greater and more profitable Traffick in this Article, the Price rose; and the more Assistances were drawn from it for the State: in EDWARD the Third's Reign, toward the End, we read of Subsidy after Subsidy on Wool: and in RICHARD the Second's Reign more Subsidies were demanded: the Traders complained, and the Matter being can-

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* *Decem Scriptores.*

† *Stillington's Chron. p. 72.*

didly examined, it appeared that though they were not wholly without Reason of Complaint, yet the Trade could bear additional Loads, and that they might raise Fortunes.

In the Reign of HENRY the Fourth the Sanction of Parliament granted to the King, for a limited Time, a Subsidy of fifty Shillings upon every Sack of Wool belonging to the Natives, and four Pounds on those of Strangers exported; and such was the Produce of Wool in BRITAIN at that Period, and such the foreign Demand for it, that the Quantity exported was not less than a Hundred and thirty Thousand Packs in a Year: and in RICHARD the Second's Time the Subsidy had amounted to a Hundred and sixty Thousand Pounds. This is related by PRYN, and the other Historians, and is supported on the best Authorities.

The same Subsidy that had been granted to HENRY the Fourth, was allowed for four Years in HENRY the Fifth's Time.

In the Reign of HENRY the Sixth we find thirty-three Shillings and Four-pence a Sack allowed to the King on the Natives Property in this Article; and forty-three Shillings and Four-pence on that of Strangers. The woollen Trade encreased under all this Demand, and NORWICH about this Time became eminent in it.

In the former Reigns the large Subsidies on Wool had been granted only for two, three, or four Years, in Time of Necessity; but in the Reign of EDWARD the Fourth, the Charge of thirty-three Shillings and Four-pence on the Wool of the Natives, and of three Pounds Six and Eight-pence on that of Strangers, even the naturalized, was granted to him for Life.

Even this proved no Check to the Traffick. Enclosures became more frequent; the Land was more improved, the Management of the Cattle and their Wool was better understood; and ENGLAND carried the Praise for this Article before all other Nations.

In the Reign of RICHARD the Third, though the Traffick was encumbered with large Subsidies, it encreased continually. In the succeeding Reign of HENRY the Seventh, the greatest Regard was shewn to Trade in every Article, and in none more than this. The Exportation of Wool was limited, and the Manufacture of Cloths encreased accordingly.

In HENRY the Eighth's Reign the Produce of Wool was greater than at any Time before; and its Price encreased with the Quantity; such was the Demand for it Abroad, and such the Consumption of it at Home. Farmers were laid under certain Limitations, as to the Number of Sheep they were allowed

lowed to keep; but these were very extensive ones, and we may see by the Account preserved of this Transaction, and of the Price of Things at that Time, to what an Advance the Care of that Animal, and the Price of its Flesh and Wool, had risen.

No one was to have more than two Thousand, but this with many Exceptions. The Statute, by way of Reason, recites “The advanced Price of all the Native Commodities in the Kingdom. That some Persons had at that Time vast Numbers of Sheep, which for Viſtual had riſen in Price from two Shillings and Four-pence, or at the moſt three Shillings, to fix Shillings, or five Shillings, or four Shillings at the leaſt; and that a Stone of Cloathing, heretofore in ſome Shires accuſtomed to be ſold for Eighteen-pence or Twenty-pence, had riſen to four Shillings, or three Shillings and Four-pence at leaſt. In others, where it had been ſold for two Shillings and Four-pence, or two Shillings and Eight-pence, or three Shillings at the moſt, it was then ſold for five Shillings, or four Shillings and Eight-pence the leaſt.”

If we look back to the Prices of Wool in the thirteenth and fourteenth of EDWARD the Third, which was near two Hundred Years before, the loweſt, viz. the Wools of CUMBERLAND and WESTMORELAND, were ſold for above two Shillings per Stone, excluſive of the Duty, which was ſomething more than one Shilling and Six-pence per Stone; and thoſe of SALOP, at better than four Shillings and Ten-pence per Stone, in like Manner. So that in Fact, there ſeems to have been at this Time, no Advance in the Price of Wool from the Period juſt mentioned: but very much the contrary, conſidering that the Shilling was then two Hundred and Sixty-four Grains; and at this Time, but one Hundred and eighteen. Nor was it any Advance from the cheap Price of which H. KNYGTON ſpeaks, becauſe the Shilling was then two Hundred and thirteen Grains. Much leſs was Wool dearer at this Time, than in the fourth of HENRY VI. the Price being then not only nearly equal to the higheſt Rate mentioned in this Act, but the Shilling then, at the loweſt, contained Twenty-four Grains more than at the Time of the Act; and therefore we are to ſuppoſe the Complaint then made concerning the Dearnels of Wool, to have had reſpect to ſome intermediate later Times, in which the Price of Wool does not now appear; and which was probably occaſioned by the Monopolizations of the Merchants of the Staple, and the Manufacturers.

As to the Price of Viſtual, it will not be amiſs to inſert here a little Piece of Hiſtory, which Biſhop FLEETWOOD takes from Mr. STOW, in the Year one Thouſand five Hundred and Thirty-three. It was that Year enacted “ That Butchers “ ſhould ſell their Beef and Mutton by Weight: Beef for a “ Half-penny the Pound; and Mutton for three Farthings: “ which being deviſed for the great Commodity of the “ Realm, as it was thought, proved far otherwiſe. For at “ that Time, i. e. one Thouſand five Hundred and Thirty- “ three, fat Oxen were ſold for Twenty-fix Shillings and “ Eight-pence, fat Weathers for three Shillings and Four- “ pence, fat Calves for the like Price; and a fat Lamb for “ Twelve-pence. The Butchers ſold Penny Pieces of Beef, “ for the Relief of the Poor; every Piece two Pounds and a “ half, ſometimes three Pounds: and thirteen, ſometimes “ fourteen of theſe Pieces for Twelve-pence. Mutton Eight- “ pence the Quarter, and a Hundred Weight of Beef for four “ Shillings and Eight-pence. What Price it has grown to “ ſince needs not be ſet down. At this Time alſo, and not “ before, were foreign Butchers permitted to ſell their Fleſh “ in LEADEN-HALL Market of LONDON.” I ſuppoſe by Foreign Butchers, he means ſuch as lived not, or had not ſerved their Apprenticeship in LONDON.

CHAP. XL. *Of the Wool Trade from the Time of HENRY the Eighth.*

WE have ſeen what a prodigious Advance the Wool of ENGLAND made in the ſeveral preceding Reigns, and we ſhall find it in this continue encreaſing.

Huſbandry had been in early Times but very little underſtood in ENGLAND, but the Regard to this Commodity, the Demand for which was ſo conſiderable, and the Price ſo large, gave a Spirit to the People concerned in it at that Time, which we wiſh had been continued to the preſent.

In EDWARD the Sixth's Reign we ſeem to have had Farmer's in ENGLAND, who underſtood the Management of Paſture Ground ſo well, that it were happy if Books had been written on the Subject, which had perpetuated their Improvements. The great Benefit of Encloſures was a little before underſtood fully, and they encreaſed in the Reign of EDWARD the Sixth. The Care of the Paſturage grew with the Number of Encloſures, and the thriving of Sheep, and the Price of Wool, with it. That Commodity ſold in this Reign dearer than in any of the preceding. Statutes were made from time to

to time, to encourage the Manufacture of Cloths, and Marts were established by Authority in different Places.

In the Reign of PHILIP and MARY the Subsidies granted to EDWARD the Sixth were continued, only with a Limitation in Favour of naturalised Strangers, or such as should be naturalised. Many good Statutes were enacted in Favour of the woollen Manufacture in this Reign; and it throve greatly under the prudent Regulations that were established, and extended itself to many Parts of the Kingdom.

In QUEEN ELIZABETH's Time a Subsidy was granted for Life on this Article, included in Tunnage and Poundage: many good Statutes were made in that Reign, and Numbers of the FRENCH and FLEMISH engaged in the Cloth Trade, leaving their native Country because of Persecution, brought over their Secrets, and encreased our Credit. In this Reign Wool unmanufactured rose from its former Price, which might be called Thirteen and Four-pence, to two and twenty Shillings a Tod.

We may safely establish the Period from the End of EDWARD the Sixth's Reign, to the End of QUEEN ELIZABETH's, as the most flourishing of all Times for the Wool Trade of ENGLAND. It has never risen much higher since, and it has very often been much lower; in general, considerably below that Standard.

Yet even in that Time we were far from supplying all the World, or all EUROPE, with Cloth; for there were many other Countries very eminent in the same Manufacture: this therefore, as we have shewn before, is an imaginary Notion; and it is altogether erroneous to suppose we ever did, or ever shall have that vast Trade to ourselves. It is enough if we can get the Superiority in the Manufactures, which doubtless we may; and we may be very proud of our Success, if we can yearly bring in such Sums as it then raised; which were, moderately speaking, near three Millions a Year.

In the Time of JAMES the First, Wool afforded Subsidies, and that largely. New Regulations were made, and Statutes enacted. Monopolies and Oppressions were introduced, but the Clamours of the People got the better of them: the Desire of growing rich too fast became however general among the woollen Dealers, and hurt the Trade extreamly: Abuses were committed in the making Cloth; and our Credit in Consequence declined, during this Reign, in foreign Markets. Proclamations were published to prevent the Exportation of Wool, and Search was made into the Nature of the Abuses;

but

but in vain. The Manufacture dwindled, and the Price of Wool fell from Thirty-three to eighteen Shillings a Tod.

The first Years of King CHARLES the First's Reign, promised the Revival of the woollen Trade; but the Disputes succeeding reduced it lower than ever. Proclamations now took the Place of Statutes, and the Exportation of Wool was forbid by several of them.

In 1640, Wool was advanced again to Twenty-four Shillings the Tod.

In 1671, many Attempts were made to restore these Manufactures to their former Glory. The bad Consequences of suffering our Wool to be exported unmanufactured were shewn; and Propositions made for gaining several hundred Thousand Pounds a Year, by throwing that Trade into a better Method: but these were Times in which Men better knew what should be done, than how to do it.

In 1685, the FRENCH began to supply foreign Markets with what they called ENGLISH Cloths. These had been made of ENGLISH Wool, and while that was, in despite of all Remonstrances, suffered to be exported, and so many Disadvantages laid on our Manufactures at Home, it was no Wonder they could under-sell us in the same Articles. The publick Attention was awaked by this, the Exportation of Wool was absolutely prohibited, and great Encouragements were given for the Produce of Wool, and for the working it here into marketable Manufactures. This raised the Spirit of the People, and the Advantage was soon seen: happy had it been if the Measures so projected had been as properly continued.

When Wool, except in woollen Manufactures, was prohibited Exportation from ENGLAND, the FRENCH, and other neighbouring Countries, got it from IRELAND; and this was soon seen, and its Disadvantages; and Laws were enacted against it.

In 1703, the Woollen Manufactures began to flourish again in ENGLAND: a Treaty was soon after made with PORTUGAL, very advantageous to them; and there was the Appearance of their again making great Progress. The FRENCH droop'd in this Article, for some Time after they were deprived of our Wool; but they found the Way afterwards to rival us, with what they produced at Home, or got from elsewhere; and the Manufacturers with us saw that there was no Way but Integrity in their Dealings, and a Care of the Trade that could give them the Preference.

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These great Articles of the Trader's Character, were not found: integrity was wanting in some, and Knowledge or Attention in others, and for several succeeding Years Things, in this Respect, went worse and worse: the Neglect of those most concerned, let FRANCE get our Wool again in great Quantity, and our own Manufacturers drooped in Proportion: for this has been found at all Times, that although the FRENCH can carry on their Traffick in this Article without us, yet they always succeed best when they have most from us; and we droop in Proportion.

To close this important Consideration we must observe, that on two Things depend the flourishing State of the BRITISH woollen Manufacture: on the Care of the Husbandman in the proper Management of his Sheep and their Produce; and on the preventing its Exportation when we have it in the proper Condition. We have laid this short History of the Rise and Progress of the woollen Manufacture before the Husbandman, to spirit him up in this great national Concern; and to shew him that they are idle Declaimers, who tell him ENGLAND always must be the Country for the best or largest Quantities of Wool; that he may know how much it is necessary to exert himself in a Concern, on which the Welfare of his Country, and his own Advantage so greatly depend.

Having given him this full Detail of the State of the Trade, we shall proceed to the Practical Part; and acquaint him how he is to manage his Wool to the best Advantage. We shall not enter upon a nice Detail of the Manufacturer's Profession, but only lay down the plainest and most profitable Rules for so much of the Management of Wool, as concerns the Farmer: that is, the preparing the great Part for Sale; and the working up the rest at Home, for the Service of his Family.

C H A P. XLI. *Of cleaning, carding, and greasing of Wool.*

WE have, in its proper Place, laid down all the Rules needful for the Husbandman for the Choice, breeding, and feeding of his Sheep, and have at large acquainted him with all that is needful to be done, in the great and important Article of Shearing.

We will suppose therefore that he has got his Wool from the Backs of his Flock, and proceed to tell him what he is to do with it. The Mistress of the House naturally undertakes the Office of preparing the Wool for her Family Clothing: the Husbandman is therefore to deliver to her such a Quantity

tity as will answer this Purpose, rough from the Hands of the Shearers.

The first Thing to be done with this is to open it with a Pair of Shears, and cut away all the foul Pieces, Knots, and Lumps of whatever Kind. These must be laid by for meaner Purposes, and the rest thus cleansed must be broke and divided very carefully between the Hands, that there may be none of it left matted together.

When it is all thus clean, loose, and fine, it is ready for carding: but as some will be required white, and other Part coloured, it is to be separated for that Purpose. Such as is for Colours must be divided into different Parcels, according to the intended Dyes; and the usual Way is to keep each Parcel in a separate Bag of netting, with the Weight marked upon it. These are then to be sent to the Dyers, and the Owner will be sure, by this Precaution of the weighing and marking, not to be deceived.

The white Wool as it is, and the other when dyed, are to be wrought just in the same Manner.

The first Operation is carding: and the Intent of this is to mix and blend equally every Part; to tear it open perfectly; and to discover and separate any Knots or Lumps, which may have been so small that they were not observed in the breaking of the Wool by Hand.

This carding should be very carefully performed by Means of a Pair of Stock Cards well fastened to a Form. The whole Quantity is to be over and over combed and carded on these, and the least Knot that is found is to be separated.

When the Wool has gone through this careful Management, it is to be greased. This is done by Means of Oil; and the common Kind of Oil used for the Purpose is the Rape Oil made from Coleseed, which we have before named in its Place.

The Wool is to be spread evenly upon a large flat Bed, and the Rape Oil is to be sprinkled on it carefully with the Hand, till there is enough put on to wet the whole in every Part. Then the Wool is to be moulded and worked about with the Hand, that every Thread of it may be moistened. The best Way is to turn the whole once, or oftener, as the Oil is sprinkled upon it; and by that Means it works in the easier. Every Part must have its Share, that is the great Concern. Yet in the Care of this there must be Regard had to the Quantity of Oil employed: it would be easy to wet the Wool, by pouring on a great deal of Oil at once, but this would

to spoil it: the Art consists in having every Part really wetted, and yet none too much. This is the Reason of sprinkling the Oil on softly, and turning the Wool often while it is doing; and in this consists the Art of greasing, as it should be: it is of the greatest Consequence, to moisten the Wool well with a little Oil, for on this depends the Perfection of the Web. If too much be used the Thread will not draw, but will fall into very small Pieces.

There is no better Way of being sure of finishing this right, than the trying it at Times as it is doing. When the Wool is greased it is fit for spinning; therefore nothing will be so proper as to have a Wheel by, and try it from time to time. A little Oil should be worked in at first, and then the Wool tried on this Wheel: if it draws dry and breaks, then a little more Oil is to be used; for the Use of this is to keep it moist and supple, and to make it hang together: this Purpose it excellently answers when a small Quantity of it is well mixed with the Mass; but as we have observed already, when too much is used, and it is put to the Wool in a careless or unartful Manner, it takes quite a contrary Effect, and the Wool falls to Pieces.

When the Wool, on trying it, draws well and holds together, the Quantity of the Oil is right. The Eye and the Hand will judge of this, when People are very much used to it, but there is no Way so sure as this of Trial. In general Wool requires somewhat less than a third Part of its own Weight of Oil for this Operation. Therefore that those who are not used to the Manufacture may proceed upon some Certainty, let them first weigh the Wool, and to every three Pounds of it allow a Pint of Rape Oil, bare Measure; or to every ten Pounds of Wool three Pints of Oil: let about two Thirds of this be used at first, and then the Wool tried on the Wheel, for sometimes this will do; and if not, let some more of the Quantity be used, but carefully and with great discretion.

Oil is the common Thing used for this Purpose, but any greasy or fatty Substance will do: and indeed any Kind of Oil. Where Rape Oil was not to be had I have seen other common coarse Oil used; and many a good Housewife has made Hogs Lard answer the same Purpose; but the Oil mixes more easily, and more thoroughly with every Part of the Wool. When Hogs Lard, or any other solid fatty Substance, is employed instead of Oil, it must be melted, and very carefully sprinkled on while it is fluid, and mix'd well in by turning and softly working with the Hands.

C H A P. XLII. *Of tumming and spinning of Wool.*

THE Wool may, for some Purposes, be spun as it comes from the Hand of the Housewife in the greasing; but the better Way is to use this only as a Preparation for the tumming. This tumming is another carding; it brings it to a great Degree of Fineness and Suppleness, and makes it fit for all the Housewife's Purposes. The Method of tumming it properly and effectually is this.

When it is thoroughly oil'd or greas'd, and will hang in a Thread from the Wheel, let it be very well worked in the Hands, and then spread out as at first. Let a Pair of long-tooth'd Cards be made ready; and let it be very well carded and combed again, drawing it perfectly fine, and separating every thing that is knotty, tangled, or uneven. These Pieces, thus separated, are called Tumming, from the Name of the Operation; and they are to be reserved by themselves for other Purposes. They are not to be mixed with the first foul Parcel, because having gone through so much more of the Operation, they will be a great deal finer than they.

The tumm'd Wool is now perfectly ready for spinning. The Wheels must be large, and a steady and careful Hand must be employed in the spinning of it.

There is so much Difference between the Wool of one shearing and another, that all will not spin to the same Fineness. No Force is to be used in this, for it will not succeed. If any one should attempt to force a coarse Wool to run into a fine Thread, it would never answer in the other Parts of the Manufacture. Things must be taken as they are; and when the Wool is suffered to run from the Wheel well, as it naturally offers, it will be sure to hold good in every succeeding Process.

A judicious Person will see, from the Nature of the Wool, what Service it will answer from the Beginning, but this is not essential; for whether it be formed for a larger or a finer Thread, the same Care is to be taken of it in every Article we have already named. The Difference arises partly from the Breeds of Sheep, and partly from the Care taken of them in their Management; both these Articles we have treated of already, and therefore need not repeat what we have delivered on those Heads.

When the Wool is of a coarser Staple it should not be wrought into a fine Thread, for if this be done it will want Substance when it comes to the Mill; it will beat to Pieces, or

never bed well, and consequently the Cloth will have little Strength, and do little Service.

In the same Manner if any one should force a Wool of a finer Kind to spin out into a thick Thread, being against its Nature, it would be greatly to its Disadvantage. In this Case a great Part of the over Thickness of the Thread must be taken away afterwards to waste, or the Cloth will wear coarse.

This is all the Caution required in the common Way of spinning, and the doing it properly and well depends, as we see, principally upon the keeping a regular Hand, and letting the Wool work according to its Nature; but a great deal more may be done by those who are expert. There may be two Kinds of Thread spun; and indeed it always should be so. Two Manners of spinning should make these two Kinds of Thread, which are called the Warp and the Woof.

The Difference is this. The Warp is to be spun close, round, and hard twisted, and it should be strong and very well smoothed: the Woof may be spun more loose, open, and but half twisted. The Reason of this will appear very plainly, when the Farmer considers their Use and Condition. The Thread of the Warp is to run through the whole, and to endure the fretting and beating of the Beam: the Woof, on the contrary, requires no great Strength or Smoothness, because it only crosses the Warp without any Violence or Straining.

It is not only that the Woof does not require the Firmness and hardness of the Warp Thread; but its being looser and softer makes it answer the Purpose better: it beds the closer and evener in the working, and the Warp has all the necessary Strength for keeping the whole together.

The Intent of the Woof is to cover in and unite all together, and this is to be perfected by beating in the Mill. This is an Operation altogether needful to the Cloth, yet the less of it can be made to answer the Purpose the better. Now the proper spinning of the Woof Thread is an important Article in this Respect. Many a good Housewife thinks she never does well unless she make one Thread as hard as the other, and therefore she orders all the Parcel to be spun alike, thinking the leaving the Woof thus open to be only a Piece of Idleness. But the looser this Woof Thread is, the easier it is to make it cover, and the less beating it takes; the harder the more. This is an important Article, and has been much disputed, but the Practice in the Cloth Countries, which is founded on long Experience, ought to determine it. 'Tis a common Opinion that the making both Threads hard, though
it

it requires a great deal of beating to bring the Cloth to Form, yet gives it Strength: but this is proved an Error.

The Warp is the Thread on which the Strength of the Fabrick is to depend, and as to the other, its being hard is found to be of no Service. It makes the Cloth fret and wear, whereas the leaving an open loose Thread for the Woof, gives it a pliable Softness that prevents all fretting and cracking.

We hear every body of late speak of the FRENCH Cloths; they praise them for their Pliantness and easy Wear; and though they are in reality greatly inferior to the ENGLISH in Substance, and many other Particulars, yet People prefer them for this Reason. A Desire of being serviceable to my Country in this great Article, has led me to make Enquiries among those who understand the FRENCH Clothiery, and I find it is altogether owing to their spinning two Threads out of every Parcel of Wool, and keeping one for the Warp and the other for the Woof, the latter of which they make so loose that 'tis hard to work it. The Consequence is, that a very little beating brings the Cloth into a Body, and when finished it is soft, pliant, and very fit for wear. One would think these FRENCH Cloths, by their Look, and by feeling of them, could do little Service, but the contrary is found upon Trial. They never crack, and the Looseness of the Woof Thread rising from time to time, keeps them from wearing thread bare. Our hard Cloths are very liable to grow bare at the Seams; these never do, because they are less harsh. They are fitter for Gentlemen's Service than for labouring People; but it would be easy to follow their Practice more moderately, which is what we recommend to the Husbandman, in preparing Cloth for his own Family, and then there would be more Service and more Credit every Way in these Cloths, than in those which are made every Way with a harsh and hard Thread.

C H A P. XLIII. *Of the winding the Thread, and finishing the Work.*

WHEN the Wool, after the dressing, oiling, and tumming, is spun into Thread, or Yarn, it is for Convenience to be wound. Those who continue the old Housewife's Practice of spinning it all alike, have nothing to do but to wind it off as it is finished from the Broch, into a Clew or round Bundle. But the better Way is, as we have said, to spin it in two Kinds, and wind each off in its separate Clew,

the warp Thread and the woof Thread. In this Condition it is ready to be made into Cloth. The making it up is the Business of the Weaver, a Trade to be learned by an Apprenticeship, not by any Description that can be given in Writing; nor is it our Purpose here, for we limit ourselves to the Business of the Husbandman alone, for whose honest Service this Work is written. However, though we are not to instruct the Weaver in his Profession, yet it will be proper to inform the Farmer so far in the Nature of it as concerns himself; that is, to give him just so much Insight into the Work, that he may know whether he has Justice done him or not.

In the first Place, before the Yarn is delivered to the Weaver, it is fit the Owner should know how much Cloth it may make; I have known an ignorant Person cheated, in this Respect, of half, nay, two Thirds, by the Villainy of the Weaver.

The Quantity of Cloth will be very tolerably determined by the Weight of the Yarn. We have advised the weighing of the Wool before, but it will be proper finally to weigh it again, when it is in the Clews: this is very easy, and as there may have been some Waste in the former working, it is the best Method.

The general Computation, in the Language of the Workman is, that it will run Yard and Pound; and this is in the common Run true, provided the Wool have been originally good, and the spinning carefully performed. If the Yarn be coarse it will make less.

This being determined, the next Care is to observe how many Pounds of Yarn are laid in the Warp, and so many exactly must be reserved for the Weft or Woof. This is a Rule not universally practised, but there is none better. Even and even is the Practice of the best Workmen, when they have a Mind to make the best Cloth. There may be Differences, but they will be for the worse, at least they certainly will in the Cloths we are treating of, which are the common Kind for the Service of the Family.

If the Owner will carry his Observations farther, it will be so much more to his Advantage: though he cannot do the Weaver's Business, he can know when it is well done, and he should over-look it often to see that it be so. He is to observe that the whole be woven close and true, and in every Part alike.

From the Weaver the Cloth is to be carried to the Fulling Mill, and there he may see also that the Business be done well
and

and carefully. We have shewn him that some Yarn will make the Cloth require more milling than other: but if this have been spun well in the two Kinds, let him see that it have not more than it requires.

The scouring Earth is the next Article to be considered, and none is of more Importance. It is a most necessary Ingredient, but it may be a very hurtful one. Its Use is to clean, but it may tear the Cloth: its Fineness is all in all on this Head, for if it be coarse, and the Work ill managed, it may very naturally and easily beat Holes in the Cloth.

From the Fuller the Cloth is to be carried to the Shearman, and there, if the Eye of the Owner follow it, he will be sure to have it the better done; he is to see that this Workman hurle it, and dress it sufficiently; and shear it according to his Purpose: Moderation is the best Rule. If it be left too rough it will not wear clean, and if too close it will be soon thread-bare.

C H A P. XLIV. *Of the dying of Wool.*

THE Husbandman will consider in this Place, as in the preceding Chapter, that we are writing solely for his Service, and the Reader who has Candour will not pursue the Subject farther in this Place, nor censure us for having considered it thus far. We do not intend to teach the Art of Dying, any more than we attempted before to instruct our Husbandman in the Trade of Weaving. We only aim to give him all the Information that may be needful, and to lead his Curiosity no farther. We have, in the last Chapter, told him how he is to judge of the making up of his Cloth, but in this we shall proceed a little farther. We shall not enter into the Business of the Dyer at large, but shall shew the Countryman how he may, in those Instances that serve his common Purpose, tinge his Wool at a small Expence, and do in a Manner all within himself.

The Colours the Countryman will desire to give his Wool, may be reduced to a small Number. Black, red, blue, green, and yellow, may be named as the five Principal, and if we add to these a pale Purplish, an ash Colour, and Hair Colour, from one or other of these, and the Mixtures composed, as we shall shew from these variously combined, he will draw all the Variety that he desires.

For blue, grind in a Mortar a Pound of Indigo-blue, and mix it with two Gallons of stale Urine, set it on the Fire,

stir it well together, and put in the Wool when it is made moderately hot. Let it continue some time, and it will have a good strong blue Colour.

The Quantity of the Ingredients must be proportioned to that of the Wool; and the best Time for dying it is before the oiling.

To die black, beat to a gross Powder two Pounds of Galls, put them into a Pot with two Gallons of River Water, put to them one Pound of common green Copperas, boil them up well together, and the Liquor will be like Ink. Put the Wool into this and boil it. Then let it cool, take it out, and hang it to dry.

To dye red, set on a Quantity of River Water, in a large Earthen Vessel. When the Water is scalding hot put in a Peck of Wheat Bran: let this boil a few Minutes, then pour it into a Tub, and put to it twice the Quantity of cold Water. Set this by for a Week. Then weigh the Wool you intend to dye red, put it into the Water and Bran; and with it, to every ten Pound of the Wool, one Pound of Allum. Let these boil together an Hour: then take out the Wool. Beat to Powder a Pound of Madder Root, put it into Bran and Water, and when it is hot, and the Madder is well mixed with it, put in the Wool, break and divide it well with the Hands; and when the Liquor is so hot that the Hands cannot bear it, stir it about with a Stick; when it is well coloured take it out, and hang it up to dry.

To die yellow, boil the Wool in Allum Water, made as strong as before directed; then take it out, and hang it to dry. Set on a large Pot with River Water, and a good Quantity of Dyer's Weed, of which, as also of Madder, we have spoken in their Place. Put the Wool into this, divide and break it well, that it may receive the Colour throughout, and it will thus become of a very good strong yellow.

To die green, the Husbandman's best Method is first to die his Wool blue, as we have directed already: when it is dry in this Colour let him set on a Pot of Water with Dyer's Weed, and put in his blue Wool. It will receive the Die in the same Manner as the other, and by a natural Consequence the Wool become green, because a Mixture of blue and yellow is always green.

To die a pale Purple the same Ingredients are to be used as for dying black, only in less Quantity, and in a different Management. The black is only a purple carried to that Extremity. This is plain from Experiments easily tried. The same Ingredients that make this black Die make Ink, and they

they will always make purple instead of black in a smaller Quantity. If Copperas be dissolved in Water, the Liquor will be clear. Then let Galls be boiled in Water, and some of that being dropped into the other, it will raise a purple Cloud, and when more is added it will be darker, till it become quite black. In the same Manner this Die, which is for black in the common Way, may be made to answer for a pale Purple. It is to be done thus:

Bruise some Gall to a coarse Powder, set it over the Fire in a Vessel of River Water, and when the whole is hot put in the Wool. Let it boil half an Hour, then take it out and hang it to dry. The Colour of the Wool will be scarce at all altered by this. Let the Liquor be poured off clean from the Galls, and put to it a smaller Quantity of Copperas than is ordered for black dying. The Liquor will instantly become black. Draw the Wool lightly through it, and it will get a pale purple Tinge. If it be not deep enough put it in again. The Care must be not to make it too deep.

To die Hair Colour, set on a Pot with strong Allum Water: boil the Wool in this, and then take it out.

Then mix together a good Quantity of Soot and Urine, and when they are hot put in the Wool. Let it remain a moderate Time, then take it out and hang it up to dry. This makes a very good, serviceable, and lasting Colour.

To die Ash Colour make a Liquor in the same Manner as for the Pale Purple, but instead of putting in the Wool boiled only in Galls, use Wool died red, as before directed, with Madder. This will make a very pleasing Ash Colour, with a light Glow of the red, which will be very agreeable.

We have thus laid before our Husbandman the Method of dying all the useful plain Colours, in an easy and cheap Manner; and shall, in the same Way, shew him how to make a Variety of Mixtures in his Cloth from these simple Dyes in the Wool. The Dyers use more laborious Methods, and more expensive Ingredients; but this is sufficient for all the Purposes of the Country Farmer.

We have directed the Wool to be dyed before the spinning, which is by much the best Way; and in treating of the mixed Colours for Cloths, in the next Chapter, we shall pursue the same Method, ordering them to be made from the loose Wool thus dyed; nevertheless, if any chuse it, they may in the same Manner, and with the same Liquors, dye the Yarn or Thread after it is spun, or even the Cloth after it is wove. Circumstances may sometimes render this Management necessary, though the other is preferable.

C H A P. XLV. *Of mixing the coloured Wools for weaving.*

OUT of the plain Colours we have directed the Farmer to die, it will be in his Power to make several Mixtures, and those for Service are frequently better than the simple Colours themselves. The Time for doing this is when the Wools are dry, and before they go through any other Operation. Indeed nothing prepares them so well for spinning; for nothing renders them finer than the necessary Division of them in the mingling of their Colours.

If the dyed Wool be intended to be wrought up in its plain Colour, it is to be treated exactly as the white in all Respects, oiling, tumming, and the like: therefore nothing on that Head need be said farther: but if it be intended for Mixture, that is to be made before any thing else is done to it.

Mixed Colours may be comprised under two Heads, those which are composed only of two, and those composed of several.

Of the first Kind the best are those made up of the darkest and the lightest or brightest Colours, for these give a Spirit: whereas two light, or two dark Colours together, make no considerable Variations.

The Proportions of the several Colours in these Mixtures, may be varied in a Manner without End; but there is one Proportion which is in general better than any other, and is therefore worthy to be advanced into a Kind of fixed Rule. This is when a proper light and a proper dark Colour are chosen, to weigh two Pounds of the dark, and one of the light, for the Mixture, and in the same Manner for any larger Quantity, the bright Colour being only one third Part of the whole. Thus if we suppose blue and red to be the two plain Colours, of which a Mixture is to be made, and the whole Quantity intended to be used to be fifteen Pounds; in this Case there should be ten of the blue and five of the red, and so in all other Cases.

The Colours thus produced are what are call mixed Colours in a distinct Manner, for when more are used they are called Medleys; and the Way is this: Suppose three Colours, for Instance, are to be mixed; if two be dark and one light, the Method is to take an equal Quantity of each of the light Colours, and twice the Weight of both the others of the dark one: on the other Hand, if it be a Medley of two dark Colours

Colours and one light, then an equal Quantity of each is to be taken, and they are to be perfectly well mixed together.

When the Wools of these several Colours are weighed out, a large Sheet is to be spread upon the Ground, and upon this is to be spread an even and thin Layer of the darkest Colour, or of one of the dark Colours, when two are equally dark: upon this is to be spread another Layer of the lightest Colour, and so on interchangeably Layer over Layer, till the whole Quantity of Wool that was weighed is spread on the Sheet.

Then this Wool is all to be rolled up into one thick, hard, and stiff Roll. The Way is to begin at one End, and carefully turn up the Edge round it self. This makes a Beginning, and the rest all rolls upon it very easily; a steady Hand is to be used, and the whole will be thus brought into one long thick Mass.

One End of this Roll is then to be made fast in a Frame, or a Person is to kneel upon it, to keep it from moving or untwisting, and beginning at the other, the whole is to be pulled out into small Pieces. The spreading and rolling of the Wool had before very tolerably mixed the several Colours, but this does it entirely; the whole will now be an uniform Mass of a medley Hue, as if dyed of three or more Colours together.

When this is done the Wool is all to be carded and combed together, by a Pair of Stock Cards well fixed to a Form.

This compleats the Mixture, it grows into an even and perfectly uniform Mass; and if there be any Knots or Lumps in it they are to be carefully separated.

This combing is to be done exactly in the same Manner as in the Management of white Wool, before described; and after this the oiling, tumming, spinning, winding, and warping, are to be performed in the same Manner. The Cloth thus made has a very good Look, and wears clean; none is fitter for the Service of the Family.

The Farmer or his Wife may thus, without farther Information, perfectly well go through so much of the Wool-Dresser's, and Dyer's Business as is necessary for their own Concerns, and in Places where those Trades are not at Hand, it is a very great Convenience to be able to supply their Places at Home.

C H A P. XLVI. *Of Hides and Leather.*

THE Wool being disposed of either at the Market alone, or partly at Market, and partly wrought up for the Service of the Family, the Care of the Hides of Sheep, Oxen,

Oxen, and other Beasts remains, and is the Farmer's next natural Consideration.

Hides are of various Kinds, according to the Creatures from which they are obtained; and they are accordingly put to various Uses: and they may, like all the Farmer's other Products, be sold by him either rough, or with some Degree of Preparation. The entire Dressing of them is the Business of a distinct Trade, or indeed, taking in the whole Course of the Subject, of several Trades; however, it is proper he should know so much of the intended Operations, as to be able to suit his Hides, as far as lies in his Way, to them.

The Skin of the Cow and Ox Kind is so much above the others in Use, that it has in a Manner, appropriated the Word Hide to itself; those of these Creatures being called, in the common Way of speaking, Hides, and those of other Animals, Skins.

The Farmer usually sells his Oxen or Cows alive at Market, or to the Butcher, and has no farther Care about them; but it may happen that he may have occasion to kill them sometimes himself. The Hide then is sold separate. If he dispose of it just as taken off from the Carcase, it is called a green Hide or a raw Hide; but this is generally the least advantageous Method of disposing of it, because the Purchaser knows it will spoil upon the Farmer's Hands, if he does not know what to do with it farther, and therefore that he will take what is offered for it.

We shall prevent this Imposition upon our Husbandman, by acquainting him what may be done to preserve it.

In the natural Course of things a Hide will keep a great deal longer in Winter than in Summer. Those who deal in them largely are forced often to keep them some Time, or to send them to a considerable Distance before they are wrought. And in this Case they have a Way of preserving them with Salt: this is in the Farmer's Power, as well as theirs: the Hide will not be at all damaged by it, and he may preserve it thus to a better Market.

A good Quantity of common Salt is to be mixed with a tenth Part of its Weight of Allum beat to Powder. The Hide is to be spread upon a Floor, and a stout Fellow is to rub and work this in well with his Hands all over it, and particularly where there are any Crevices, or thicker Places than the rest: when it is thus well salted it may be kept some Time. The best Method is to double it up, and lay it on a Shelf in a Cellar.

This

This will answer the Purpose of keeping it some Days; but if a longer Preservation be required, for the getting a Number together, then two Days after this first salting let it be spread out again and rubbed well with Salt and a little Salt Petre. A Hide will thus be preserved any reasonable Time.

Hides may be preserved dry in the Hair, by carefully hanging them up single in an airy Place, wiping them frequently and turning them till they harden: and in this Way they will be in the same Manner capable of being put to use; but it is not nearly so well as the other.

The Buffaloe Hides from some Parts of AMERICA, are sent over in this Manner, and are dressed afterwards.

The Hides of the Cow and Ox Kind fall into the Hands of the Tanner afterwards, for tanning into Leather; but those of other Creatures, both here and in other Parts of the World are dressed by other Trades, for different Purposes. Shagreen is a Skin prepared in a particular Manner, and Parchment and Vellum are also Manufactures of Skins.

The Skin of the Sheep is the proper Material for making into Parchment, though in some Places Goats Skins are used for the same Purpose.

Vellum is made of the Skins of sucking Calves: and Shagreen of the Skin of the Buttocks of an Ass. This last is a Manufacture of the East.

Chamois, or as it is commonly called, Shammy Leather, is made of the Skin of a particular Kind of Goat; but it is commonly in ENGLAND no other than Sheep Skin dress'd in a particular Manner.

The Skins of Sheep and Calves dressed in other Ways, make also Leather of various Degrees of Value for the covering of Books, and other such Purposes: the Calf Skin being always much more valuable than the Sheep's.

The Farmer sees here what are the Uses of his various Hides, and will know by this general Account, that he need not want Purchasers for all Kinds. The Principal, which are the Hides of the Ox Kind, go to the Tanners for making into Leather; and he is ready to receive them in either of the three Conditions we have named, that is, green, salted, or dried. He throws them into Pits with Lime, and Oak Bark, and by that Means takes off the Hair, and hardens the Skin for the various Purposes. The Tanner, when he has gone through his Business, delivers the Hide to the Currier, who finishes the Preparation and delivers it for Use.

We shall not attempt to inform our Husbandman in these Particulars; they are separate Trades, and never can fall within

within the Compass of his Practice. All that he can be required to know is how, to whom, and in what Manner to dispose of the Skins and Hides, which we have shewn him, with their general Uses.

B O O K I V.

Of making Beer and Cyder. In TWO PARTS.

The I N T R O D U C T I O N.

IN this, as in the preceding Parts of this Work, we shall lead the Husbandman in the Road of Reason and Experience; considering what has been written as it deserves, and much more what has been practised as it has come to our Knowledge: we shall begin from the Foundation, that he may be acquainted with every Part, and understand every thing that is directed to be done from the making of the Malt to the brewing and fining down of the Beer in its different Kinds, and for its several Purposes.

P A R T I. *Of MALT LIQUORS.*

C H A P. I. *Of making Malt.*

MALT is a Preparation of Barley, fitting it for impregnating Water with its Taste and Qualities, in the most pleasant, wholesom, and advantageous Manner.

We shall not trace the Subject farther back than to the threshed and cleaned Barley, in this Place; because we have brought that Grain from the Seed to the perfect Corn, in a due Course of Husbandry in a preceding Part. Only we shall add, that as the best Barley will always make the best Malt, so there is an Advantage also in its having grown on a proper Soil, and in its having been dried by a right Management. On these two Articles depends the Quality of the Malt. In general that Barley which is tenderest and most mellow, is best for the Purpose, that which is hardest is worst. The Manufacturers call this last steely Barley, and they always avoid it as much as they can, knowing it will give them most Trouble, and succeed the least in the Brewing.

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It would not be of much Consequence to the Generality of those who brew, to acquaint them with the Advantages of taking the Grain from a proper Ground, and drying it in a proper Manner, for the mellowing of its Substance; because they cannot know those Things, but must receive it as it comes: but we are here writing to the Farmer, who is to make his Malt from Barley of his own growing and drying: he therefore may chuse such of his Grain in this Kind as will be sure to answer best for this Purpose.

The best Barley for making into Malt is that which has been raised on a chalky Soil, and the worst of all is that which has grown on Clay. The Difference, in this Respect, is greater than any would conceive that have not tried it, the Barley that has grown on Clay being naturally hard, and the other naturally tender.

As every Farmer will not have chalky Soils among his Grounds, we are to tell him in general, that the toughest and stiffest Lands yield the worst Barley for Malt, and the lightest and mellowest the best. Therefore let him remark such as grows on the lightest Soil he has, as fittest for this Use.

When he has fixed upon the proper Field of Barley for this Purpose, let him see it be managed according to the Design. Good Malt requires that the Grain be full ripe, and perfect in the Ear. It is a common Piece of Neglect to mow Barley at random, often before it is ripe: in this Case the Corn is lean, and will never yield a rich Malt.

When it has stood to a proper Degree of Ripeness for mowing; it must be carefully dried after cutting: for if it be housed before it is properly seasoned, it will contract an ill Taste, and will make poor Malt, beside that it will give a great deal of Trouble in the making; not coming, as they express it, so regularly as other better Grain. The Barley being thus far properly managed, is to be threshed and carefully cleaned, and then it is ready for malting.

Making of malt is no more than softening and mellowing the Flour of the Barley, and then properly drying it. It is mellowed by means of Water, and it requires a different Time of steeping for this Purpose, according to the Nature of the Grain.

Such a Quantity as the Farmer intends to use for this Purpose, is to be put into a Leaden Cistern, or other Vessel, and Water is to be poured in till it be six Inches deep above the Grain. This will allow for the swelling, and this will do the Business in two or three Days, according to the Nature of the Grain; the finest Barley always taking the Water the most kindly.

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In order to know when it is steeped enough, a grain is to be taken out, and held end-wise between the Thumb and fore Finger, pressing it gently. If it be hard and stubborn it is not steeped enough. When it is in right Order it will yield and give Way a little; there will be a Softness perceived in the floury Part or Body of the Grain, and the Husk will start or part a little from it: this shews it is just in right Order.

The hitting this Time exactly is the nicest Part of the Art of malt making: for if it be not steeped enough it will not answer well in the rest of the Process, but will give great Trouble, and make imperfectly: and on the other Hand, if it be steeped too long it will lose its Flavour and its Strength: the Beer that is made from it will have a Deadness from the first, and no Quantity of the Hops will make it keep well.

When the Barley is in this right Condition, the Water is to be drained from it, and it is to lie to come on the Floor: this it will do in a little more than twelve Hours, in favourable Weather, but sometimes it will be twice or three Times as long.

From the Cistern it is to be put into a square Hutch, and there it is to lie quiet about thirty Hours. Then it is to be worked Night and Day, in one or two Heaps, as the Weather is hot or cold, and turned about once in six Hours, the outer Part inwards, and the Bottom upwards; always keeping a clear Floor, that the Corn lying next it may not be chilled.

This Care is to be continued till the Malt begins to spire, or, as the common Expression is, to come: after this it is to be turned once in three or four Hours; and as it comes more the Heap must be spread wider and thinner, to cool it. The best Method is to lay it out in general in Parcels two Feet and a half thick, and about ten Foot broad, to come and chip gradually, for it should neither spire too much nor too quick.

When it is come enough it is to be turned once in two Hours or less, for four and twenty Hours together; and when it is fixed, and the Root begins to be dead, it must be thickened again, and often turned and worked about, that the growing of the Root may not revive.

A diligent and industrious Man is to be employed for this Purpose, and he should be without Shoes for fear of damaging a great deal of the Malt. He must be careful to turn it frequently and thoroughly, and keep a clean Floor: for if he be remiss in the Management at this Time, the Malt will either mould or shoot out in Leaf. This last is the most common Accident attending ill Management at that Time of the working; and it is what the Malsters call *acro-spiring*. In this

this Case the fine Flour of the Malt is exhausted in this useless Shoot, and the rest is a Kind of Chaff.

When the Malt is so turned as that the Danger of both these Accidents is over, it may be put into the Kiln; but a better Way is to throw it up into a large Heap first; in which, being in no Danger of shooting, it may lie twelve Hours, which will mellow it in a surprizing Manner. After this it should be spread and turned once in six Hours, and this repeated four Times.

The Weather is a great Article to be consulted in Malt making, and its Changes make so great a Variation in the Process, that no fixed Rule can be established. Twelve Hours is about the Time it usually requires to mellow in this Heap, but sometimes an Hour or two less, and sometimes an Hour or two more will be better: the Intent is, that it should mellow kindly without heating too much, and this must be tried by examining it; for if it heat too fast it will be greasy and of little Value. In the same Manner all the other Times of turning must be varied according to the Temperature of the Air. The Farmer sees what is the Intent and Design of the Work, and he is to turn it an Hour sooner, or an Hour later on any of the Occasions we have named, according to the Nature of the Opportunity. If he make his Malt himself this is a very material Part of Knowledge, and, as in other Occasions, if he do not, it is fit he should understand every Part of the Process, that he may know whether those to whom he puts it to be made do him Justice.

When the Malt is in the Condition we have named, it is to be brought to the Kiln, there to be dried according to its Nature.

C H A P. II. *Of the drying of Malt.*

THERE are various Degrees of drying Malt, according to its intended Use, and different Contrivances for the doing of it.

In general the paler the Malt is to be, the more gradual and gentle must be the drying: this is the general Rule, and in this there is to be a great deal of Variation. The palest Malt will require ten Hours or twelve in drying, whereas the brownest will be very well dried in four, and a middling Kind in six or seven Hours.

There is a great deal of Variation in the Opinion of Malters, about the Thickness the Malt should lie upon the Hair Cloth for drying. Our Ancestors were so careful they spread it very thin, they rarely let it lie at more than three

Inches deep: our late Improvers, as they call themselves, lay it six Inches or more; but this is a very great Error.

By all that I can see, from repeated Trials, about four Inches is a proper Thickness; and in this Manner about a Space of fifteen Feet square will dry two Quarters of Malt.

It is not to lie here all the Time quiet. It must be turned upon the Hair Cloth as upon the Floor, and this more or less frequently, according to the Nature of the Fire, and the Time intended to be allowed for the drying. If the Fire be gentle, and 'tis a pale Malt, that is, to have ten or twelve Hours on the Hair Cloth, then once in four Hours is very well for the drying: if it be a Kind that must dry quicker, once in two Hours will be a proper Method, observing in this Case, as on the Floor, to keep a clean Bottom.

When the Malt is sufficiently dried, whether by a quicker or a slower Fire, it must be thrown off from the Kiln to the Floor, and spread thin and wide in an airy Place, that it may perfectly cool. Then it is finished and fit for Use.

There is not in all the common Arts of Life, any that require so nice a Caution as the making of Malt. The Time must be considered; three Weeks is a moderate Allowance, often it will take much longer.

As different Lengths of Time are required for the drying the different Kinds of Malt, there have been also invented various Ways of doing it. The Iron-plate Frame, and the Tile Frame, both full of small Holes, are much esteemed by many; others prefer the Brass-wire and others the Iron-wire Frame, and others the Hair Cloth: the Husbandman is not to give his Voice in Favour of any one of these in general Terms, but to consider the Use it is intended to answer: the Nature of the Malt to be dried is a material Consideration, for that Kind will do for one that will not for another; and when the most expeditious can be used, without Hurt to the Malt, there is something worthy Consideration in the saving of Fewel.

Those which do with the least Fewel are the Iron-plate Frame and the Tile Frame: they were invented for this Purpose, and are a ready and cheap Method. They dry the brown Malts very well, but they will by no Means answer for the pale Kinds.

None of the Methods heat the Malt so violently as these, the Corns often jump like parched Pease, and crack: but they get a fine brown. It is a cheap Way of drying; but let the Farmer see he is not deceived in it, especially if he be to buy Malt of this brown Sort. The Nature of it is to look dry, and

and it is not the worse for that; but those who sell it, frequently sprinkle Water over it, which it receives freely, and this makes it swell up vastly. 'Tis fairer to the Eye, but this is a Trick that takes away a great deal of its Sweetness.

People find the brown Malt dried this Way apt to spoil in keeping; but they accuse the Machine when the Malsters are in Fault: all the Damage they find in the Malt is owing to the sprinkling Water over it; which they are apt to do on all Occasions, to make their Work appear well; and this subjects it to decay in keeping. Brown Malt dried on one of these Frames, will keep as well as any, if it be spread to cool as soon as made, and no Tricks be play'd with it.

All the real Damage it is subject to is, contracting something of a Bitterness by burning; and this is owing to the Carelessness of the Maker, more than the Fault of the Frame.

This Carelessness of some, and the Tricks of others, have brought these Methods of the Plate and Tile Frame out of Fashion, but without any real Cause. They are fit only for brown Malts in their Nature, but in a fair and proper Management they dry these as well as any other of the Methods, and much cheaper.

The Wire Frame comes next in Degree after the Plate and Tile ones, and it is generally used in their Stead. This dries the Malt more gently and leisurely; but there is some Difficulty in the turning it, and cleaning the Bottom.

Of all the Methods that have been invented, the plain and simple Hair Cloth is the best for nice Work, and the finest Malts. A slow Fire under this dries it very gradually and equally, it is easily turned as is required, and when it is done, there is no difficulty in getting it out, for 'tis only turning it at once, and all is clean and clear.

C H A P. III. *Of the Fuel to be used in drying Malt.*

WE have shewn the Farmer by how many several Ways Malt may be dried in Respect of the Frame, and there is also a great Variety in the Article of Fuel, which he must consider in the same Manner: some Kinds being cheaper, some dearer; and some better, others worse. However this is not so absolute a Character but that some of those which are bad for the drying certain Sorts, may be very proper for others.

The principal Kinds of Fuel, including the Practice of the several Parts of the Kingdom, are five: 1. Coak; 2. Welch Coal; 3. Straw; 4. Wood; and 5. Dry Fern or Brakes.

The Farmer will understand that what is to be done by this Fewel is to dry the Malt, and nothing more. No Flavour is required from it, and therefore the purer the Fire is, and the clearer the Malt is dried by it the better.

All Smoke must be wrong upon that Consideration; and therefore all those Fewels that yield a great deal of Smoke, are to be rejected in the drying at least of the nice Malts.

Upon this Consideration the Farmer will perceive, that Fern must be a very bad Fewel for this Use: and at first Sight a Person might join Wood and Straw under the same Denomination, because of the Quantity of Smoke that rises from them in burning: but there is in this a Difference. All Smoke is an Enemy to Malt; but there are Varieties, and those very great ones, in the Taste and Flavour of the Smoke of different Materials. Thus the Smoke of Fern is not only very plentiful, but of a very ill Hogoe, which it will communicate to the Malt. And on the other Hand, the Smoke of Straw, though almost as plentiful as that of Fern, is so sweet, that it scarce does the Malt any Damage. The Smoke of Wood is of a middle Nature between both, not so sweet as that of Straw, nor so rank as that of the Fern.

Thus dividing our Fewel into two general Kinds; the Coak and Welch Coal being the best, and the Straw, Wood, and Fern the inferior, we have here the Degree of Goodness of these latter three; the Straw is the best of them, the Wood the second, and the Fern the worst.

There never can be a Necessity of using Fern on this Occasion, therefore it ought wholly to be excluded from the Malt-house. As to the Wood it may always be had, and must be better than Fern; and for some of the ordinary Malts it is a cheap Fewel, and answers very well. Straw, with good Management, may be made to do for any but the very best and nicest Kinds.

With Respect to the other two, Coak is the best; but the other is very good.

We advise the Husbandman to use Coak, if it is to be had; but let him see that it be good and well made; for otherwise the inferior Fewels may do better. Fine Coak is made of large Pit Coal charred, or burnt to a Cinder. It is to be burnt till all the ill Smell is consumed, and no Smoke rises from it; and in this Condition it makes the steadiest and the sweetest Fire of any Fewel whatever. It is a common Negligence to char this Coal imperfectly, but the Husbandman who dries his own Malt should examine strictly into it; for

for one smoky Piece will do vast Damage. He may see this by the Eye, for there is a particular dry Aspect which Coak has when perfectly burnt, that is wanting in such as has any of its gross Parts remaining.

The next to pure Coak is Welch Coal: this is called by many Culm. It is a fine sweet Coal, dug naturally out of the Ground. It comes in thin fleaky Pieces, and burns to white Ashes with a little Flame, and no Smoke, or very little. This brings it nearer to the Nature of Coak, but it is not altogether so pure: however, it is cheaper in many Places, and for all but the fine Malts will very well answer the Purpose.

Therefore let the Farmer, if he have Convenience, dry his own Malt, for out of this Variety of Materials, it is possible the Malster to whom he puts it may chuse the worst: in some Places it will not be worth while, because every thing must be built for it, and that the Farmer may not think this proper, when he has a small Family: but in other Places most of the Conveniences will be ready.

In the Hop Countries, the same Kiln that dries Hops will dry Malt; and so on many other Occasions: and wherever it can be done 'tis much best for him to do it at Home. As to a little Expence, let him consider 'tis a thing for which there is a constant Demand.

I shall offend the Malsters; but I must add, that if he knew their Practices as well as I do, he would see more Reasons than are here set down for doing his Business himself.

C H A P. IV. *Of the right Management of Malt, and Additions to it.*

WE have observed, that to have perfect good Malt the Barley must be in perfect Order; and in this Respect the sweating in the Mow is a great Article. Nature intends some such Practice in the finishing of all vegetable Juices. We find, that Apples carried from the Tree to the Press make a poor raw Cyder, and 'tis the same with the Barley: as the Apples must lie in a Heap, the Barley must be packed some Days in the Mow. I have known some Farmers, to save Trouble and Time, thresh their Barley from the Cart, which they intended for Malt, and I have shewn them the Effects of their Error. The Malt has been poor, steely, and hard, in spite of all the Care in making, and no Art whatsoever could brew good Beer with it.

Pure Malt requires no Addition for the making of fine Beer,

Beer, but Fancy or Curiosity have led People to make it various Ways, and some not amiss.

A small Quantity of Oats are added by some, but 'tis a Practice I cannot approve. The first Invention of this was owing to a Suspicion of the Maltster. A Farmer who had been careful of his Malt Corn would put in the Oats, that it might not be changed : and as a very small Quantity answered for that Purpose, there was not much Harm. But when those who did not understand the Reason of it came to put in more, by Way of an Improvement of the Drink, the Error was soon seen. As to this Practice, all to be said is, Oats hurt the Malt ; so the less of them the better ; but so much as will answer the Purpose of preserving it to the Owner, may be done without any great Harm.

Others mix Beans or Pease with their Barley for malting. This seems a more unnatural Addition, but I have known it answer very well : such a Kind of Malt, supposing it to be well made, and of a very good Barley, will make a mellow Drink than any other.

A very small Quantity answers the Purpose of this Addition, a Peck and half of either is enough for five Quarters of Barley, and Pease answer the best. The Taste and Qualities of both are much the same, but the Pease come better, and mix more conveniently with the general Quantity.

Though the Farmer may thus make some Additions to his Malt, he must be very careful that none are made by Accident for him. We have spoken at large of cleaning the Corn, in a preceding Part of this Work, and shall observe to the Husbandman here, that there is no Occasion which requires it to be so perfectly pure as this of malting.

The Seeds of many Weeds will get in among it, and some of these are very hurtful. 'Tis said the Seeds of Cockle give the Beer an intoxicating Quality, and in some Places Melilot is a common Weed in Corn Fields. This is a most mischievous Addition to Malt Corn ; for the Seed of Melilot is a very ill tasted, and a very strong tasted one. It gives a disagreeable Flavour to the Beer, and no Art can remove it.

Tho' Oats mixed with Barley hurt the common Kinds of Drink, yet they may be malted alone, and will make a very pleasant Liquor ; what is called Oat Ale, where genuine, is made of them, and it is then a soft and mellow Drink, not strong, but very pleasant.

Malt may also be made of Wheat, and a very strong and very fine Kind of Drink is to be brewed from it : but this is a Concern the Farmer has no Business with.

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Whichever Way Malt is made it answers the same Characters, if the Work have been well performed; and there are Methods of knowing by Trial, whether it be well made and in good Order or not. 'Tis fit our Farmer know them, that he may be able to try both his own Malt, and that he buys.

A fine Malt should be full of Flour, mellow within, thin skind'd, and of a pleasant Smell. The surest Way of trying is by biting a Corn of it cross-wise.

Another very good Method is to try it by Water. This Trial depends upon the following Principle. Barley, in its natural State, sinks in Water, but malting, when it is well done, makes it so light that it swims. Therefore to try whether it be well made, let some fine whole Grains be picked out and put into a Glass of Water. If the Malt be mellow they will swim, if but imperfectly made they will sink like raw Barley. The Corns must be perfect for this Trial, otherwise the Water will get into them, and they will then sink, though ever so good.

The Lightness in the Hand is also a good general Way of trying, and also the drawing it carefully across a Board; for good Malt will mark it white.

The Farmer will, by these Instructions, know how to make or buy good Malt, and we shall now tell him how to use it.

C H A P. V. *Of the Kinds of Malts and Waters.*

TO lead the Husbandman on to the practical Part of brewing, we shall first lay down a few Hints respecting the Nature of the Ingredients. Malts, supposing the Barley to have been equally good, may be divided into three general Kinds, from the Method of making: these are, the Pale, the Amber, and the Brown.

The Pale has a great deal of Time, and a very gentle Fire in drying; the Amber has a middle Degree of Fire, and a moderate Time; the Brown is the quickest dried of all.

The Pale is the richest, and it sells for the best Price: it may be brewed with Well Water, but the others require such as is softer.

The Amber is an excellent Kind of Malt, and the best Way of brewing it is with a Mixture of hard and soft Water.

The Brown is the highest dried, and requires River Water.

These several Kinds of Malt may be dried with any Kind of Fuel, because it is only moderating the Degree of the Fire,

according to their intended Nature ; and it is always best to give the sweetest to that intended to be the finest Malt.

Pale Malt should, for this Reason, always be dried either with Coak or Culm, and the first is much the best.

The Amber may be Straw dried, but 'tis not nearly so well. As to the Wood and Fern they are used in some Parts of the Kingdom, and Custom makes the People relish the Beer brewed from such Malt ; but to a Stranger there is a most nauseous Taste of Smoke in it.

The common Practice is to brew some one Kind of Malt alone ; but the mixing half Brown and half Pale, is a Way to make a very sound, pleasant, and wholesome Drink.

With Respect to Waters they may be ranked under four Kinds, Spring, River, Rain, and Pond. We have observed that Spring Water is very proper for the pale Malts ; but let it be such as is pure. There is a great deal of Spring Water impregnated with various Substances, as Salt, Allum, Iron, and the like. All these are improper for the common Service of Brewing. Some use them indeed for Medicinal Purposes, brewing Drinks with them that it may have their several Virtues, but this is not what we speak of here. We are informing the Farmer how to brew good Beer, and not how to make Medicines.

River Water is in general the best of all for Brewing : but to be in Perfection it should be such as is not near the Head of the River, because that will be of the Nature of Spring Water ; nor near great Towns where Filth is thrown in : and to be nice in having it in the greatest Perfection, it should not be used after great Rains when it is thick and muddy.

Clear River Water is soft, and the finest of all : it is naturally pure, as rising from a Spring, and it has been softened by its Motion, and by the Effect of the Sun and Air.

River Water in general takes out the Virtue of the Malt better than Spring Water ; and the Difference is so considerable, that about one seventh Part more Malt is required to make Beer of the same Strength from Well Water and from the other.

Rain Water is the softest of all, and makes the strongest Liquor from an equal Quantity of Malt, but the Beer made from it does not keep well. It is therefore fitter for Ales that are to be drank soon, than for Beers that are for Continuance.

Pond Water, when pure, is very good for Brewing, but where Cattle come in and disturb it, and where there are great Numbers of Fish it is never clear. In this Case it neither
makes

makes a pleasant Drink, nor takes out the due Strength of the Malt. When Pond Water is in its Perfection, it is of a middle Nature between Rain and River Water; but in Places where it is made foul by the before-mentioned Accidents, it is worse than any.

C H A P. VI. *Of Brewing in general.*

THE Farmer having, according to these Directions, prepared or purchased his Malt, and fixed on a proper Kind of Water for it, is to proceed to Brewing.

His Malt is first to be ground, and let him give Orders that this be done moderately. It should be only cracked, and in general shattered in the Mill. This is sufficient, for the Water will in that Case thoroughly take out its Virtue; and if it be broke more it will not answer so well in the Brewing.

Many desire their Malt to be ground very fine, thinking it by that Means answers better in giving out its Strength; but in this Case it mixes with the Water instead of impregnating it with its Virtues; and the Wort runs thick, and the Brewing goes on coarsely.

Let the Farmer always have his Malt ground ten Days before the Brewing. This is the most essential to the brown Malts, because it takes off the fiery Taste they got in their high drying, but it is of great Use to all. The ground Malt must be kept in a dry Place, and it always mellows in lying. The paler the Malt the less Time it needs lye after grinding. In the LONDON Way of Business, it is not easy to give the Malt this Advantage, because they brew so frequently and in such Quantities, therefore the Family Brewer has in this Article an Advantage. In general, about eight Days may be allowed to the pale Malts, and from ten to twelve or fourteen to the brown.

The Malt thus ground and kept is ready for Use, and we shall lead our Country Farmer into the Practice, by giving him a general Idea of what is the Method in LONDON, where there are perhaps the most understanding Brewers in the World.

Four Kinds of Beer are in general brewed in LONDON, Stout, common Butt-Beer, Ale, and Small Beer.

Stout is the strongest Beer, brewed from brown Malt, and is sold for forty Shillings the Barrel, or six Pound the Butt, from the wholesale Cellar.

To brew this, the Water in the Copper for the first Mash

is made to heat soon, by pouring in a couple of Bushels of husky Malt, just to spread over its Top.

The Degree of Heat to be given this, is the utmost that the Hand can endure, but it must not boil.

When it is in this Condition the Fire must be damped, and the best Way is by throwing on a good Quantity of fresh Coals. Then cold Water is to be let in till the whole is just Blood-warm. The Malt is then to be worked in with Oars, half an Hour, and this is called the Stiff Mash.

While this is beating up, more Water is boiling in the Copper. This is to be let in: and the whole being mashed again, and well mixed, some Baskets of Malt are thrown over it, and it stands an Hour.

At the End of this Time it is let out into the under Back; and is then boil'd an Hour and half. This, with the due Quantity of Hops, is the Stout.

The common brown Ale, or, as they call it, starting Beer, is made in the same Manner as the Stout; but a larger Quantity is brewed from the same Portion of Malt. After the stiff and second Mash, they cap the whole with fresh Malt and boil it an Hour, and after this Small Beer is made of it. The Difference between brown Beer and brown Ale is only that less Beer is made, and it is boiled longer and has more Hops, proportioned to the Time it is intended to be kept.

The pale Beers are brewed in the same Manner, only Pump Water is used, and it is made hotter at first, and lowered to be almost cold afterwards.

The Small Beer in LONDON is made thus. They heat the first Water with some hully Malt over it, and when it is of a due Heat they let in some cold, and run it into a Tun Milk-warm. The Malt is mashed in this; and then the second Quantity of Water is let in, which is scalding hot. It is to stand an Hour, and then be run off into the under Back.

This makes one Copper of the first Wort without putting any fresh Malt in. The next Liquor is to be Blood-warm, then hot, and then lastly, cool.

This is the great Secret of the LONDON Brewing. Their Beer has a very great Advantage from the Quantity that is brewed together; and there is a great deal of Art in putting in the first Water Blood-warm, and the rest hot: for this warm Water opens the Malt beyond any other Practice, and makes it ready to receive, and yield all its Strength and Virtues to the hot.

The Quantities we have not named in the Course of the Brewing,

Brewing, reserving them for a distinct Mention here by themselves, the Strength alone depending on that Article.

The Allowance for Stout Beer is a Quarter of Malt to one Barrel; and this is sold from the Tap at thirty Shillings. The Proportion for the common Brown Ale is a Quarter of Malt to a Barrel and Half. For entire Small Beer the Allowance is a Quarter of Malt to six Barrels, tho' some allow a Quarter to five. The Allowance for Pale and Amber Ale is a Quarter to a Barrel and a Firkin.

Thus have we laid before the Country Farmer the general Proportions and Method of working in the LONDON Brew-houses for their various Kinds of Drink; and from this general Idea of the whole Art, and the Particulars of the several Kinds premised before, he will be able to comprehend the whole Theory, Art or Mystery of the Business, and may safely and successfully enter on the Practice.

C H A P. VII. *Of brewing for a private Family.*

TO speak with Certainty, and in a determinate Manner on this Article, we must first establish some regular Quantity intended to be brewed, and some regular Size of the Vessels.

We will suppose that the Farmer has a Copper, which, when filled to the Top, holds a Barrel, that is, six and thirty Gallons; and we will say he is to brew five Bushels of Malt. He has this in the House, it has been ground a proper Time, and there is nothing to be done but to put to it the Water proper of its Kind.

Let the Water be set on in the Copper, and when it is pretty hot pour upon it Half a Peck of Malt. This will keep in it Spirit, soften it, and purify it, and make it heat regularly. When it begins to boil ladle it out into the Mash Vat, and there let it stand about a Quarter of an Hour.

It is often the Necessity of the Farmer to use but indifferent Pond Water in Brewing. In this Case let him pour Half a Peck of Bran upon it instead of the Malt, and when it boils skim that off. It will take the worst Foulness of the Water with it, and is to be given to the Hogs. In the other Case, when the Water is tolerably pure, the Malt is to be used as mentioned already; and this is not to be skimmed off, but to be ladled out with the Water.

When it has stood about the Time mentioned, the Steam will be but little, and the Farmer may look down into it and see his Face in it. This is the Country Rule, and it is a very
good

good one; for he cannot see it while the Steam rises thick, as it does from the hot Liquor. Separate Half a Bushel of the Malt, and let the Rest run slowly and leisurely into the Liquor when it is of this Warmth; let it be well stirred about as it runs in, and so mixed when all is together, that it does not lie any where in Cakes or Lumps.

It is a common Practice to beat and stir up the Malt in this first Mash into a Hasty Pudding, but this is very wrong: the whole Brewing always succeeds better when it is in this Manner only well mixed together without such Beating. It receives the hot Water the more freely and perfectly, and gives Strength to it in a very fine Manner.

When the Malt is thus thoroughly soaked, the hot Water is to be ladled on by Bowls full, and it is to be suffered to run out at the Tap in a very small Stream, not thicker than a Straw. In this Manner, as the Malt has not been mashed to Pieces in the Water, the Liquor will run off very clear, and will yet have the full Strength and true Flavour of the Malt, according to its Kind; and will much sooner be fine than in the common Way of Brewing.

This is the Method to be taken when the Farmer is for brewing a good Ale, and will make his Small Beer separately, or less regards it: but when he minds the Small as much as the Strong, the second Copper of Water must be poured on quick, and suffered to run off in a large Stream. This will make a good bodied and well tasted strong Beer, and yet there will remain in the Malt Virtue enough for impregnating the Small.

When the first Stirring of the Malt is done, let the Half Bushel that was saved out be carefully spread over it; and then let some Sacks, or other Covering, be put over the Tub to keep in the Steam.

The whole is to stand in this Way about two Hours and a half, and in that Time the second Copper of Water is to be made boiling hot.

This is then to be poured on either briskly or slowly, as we have directed, according to the Design of more or less Small Beer; and when it is in, let as much run off from the Tap as will very near fill the Copper.

Put half a Pound of fine sweet Hops in a Canvas Bag, and putting them into the Copper boil them half an Hour: then take them out, and some fresh ones are then to be put in and boil half an Hour. The Quantity of Hops must be greater for Beer, and less for Ale.

If the Beer be intended for keeping, half a Pound of fresh Hops

Hops should be put in every half Hour, and the whole boiled briskly for an Hour and an half.

While this first Copper of Wort is boiling, some scalding hot Water must be poured in upon the Malt, Bowl by Bowl; and thus so much is to be got in and suffered to run off again, that there may be the Quantity of another Copper ready for boiling, by that Time the first Quantity is boiled off.

When this is drawn off, the second-Running must be put in and boiled an Hour, with nearly the same Quantity of Hops as at first; and while this is doing, Preparation may be making for Small Beer, by pouring on such a Quantity of Water as the Farmer chuses cold upon the Grains all at once, or at twice.

This must be boiled up in the Copper in the same Manner as the Ale Wort, and must have the Hops that were boiled before. Each Copper of the Small Beer should be allowed an Hour in boiling. In this Manner five Bushels of Malt will make the Farmer a Hoghead of Ale, and the same Quantity of Small Beer; or if he chuses otherwise, his Ale will be much the stronger and better.

Each Copper of Wort must be strained off through a Sieve, and cooled in four or five Tubs.

The Farmer will find a Hoghead of Ale in this Manner made from five Bushels, a very pleasant and sound Drink: if he chuses to make it stronger, and for keeping, he must boil off only the one first Copper for Ale, and the Rest all for Small Beer; which in that Case will be of a very good Strength.

The Farmer will see that in this Method, although very different from the LONDON Brewer's Practice, yet all that is valuable in that Art is preserved. He may, if he pleases, imitate their Methods, by putting in more Malt after the second Mashing; and thus running off, according to his Pleasure, a larger Quantity of strong or of small Beer: but this is getting into a confused and perplexed Practice. The other is plain, familiar and easy; and we may affirm upon repeated Experience, that whosoever follows it punctually, will brew to his Satisfaction in every Respect, for the good Flavour and the Strength of his Beer.

C H A P. VIII. *Of the Advantages of brewing at Home.*

WHAT we have here proposed to the Farmer we would recommend also to every middling Family; and

and that for more Reasons than will at first be thought. The Difficulty upon this plain Receipt for doing it is nothing; the Time required is only a few Days in a Year, and the Inconvenience is not much: the Advantages are very many. The saving in Money is very near half in half; and the House-keeper is sure that nothing but wholesome Ingredients have gone into the Liquor, which he never can pretend to know if he buys it of a common Brewer.

Most People have been desirous of brewing at Home, but they have been deterred from it, partly by their thinking there was some great Mystery and Secret in doing it well, and partly that there required a great deal of Room, and a great many large Vessels, for the brewing but a moderate Quantity of Drink.

We have shewn this to be entirely an Error in both Respects. The Secret is in a Manner nothing, a few plain Words have described it; and in this Method which we have laid down, a moderate Copper, and a few common Vessels answer the Purpose of brewing a Couple of Hogheads.

We have only to add on this Head one general Caution, that Cleanliness be observed in every Thing relating to a Brewery. We have shewn the Necessity of it in a Dairy, and the Brewhouse is the next Article to that, requiring it to be observed with Strictness.

Many who brew at Home, find their Beer that was not at all faulty at first, contract ill Tastes, and grow very bad after a little Time; and they little suppose how much this may be owing, and how frequently it is, to the Carelessness of keeping the Brewing Vessels.

In Families where the Brewing comes seldom, the Utensils are laid by carelessly; and the Consequence of this, especially if there be any Damp about them, is, that they grow mouldy or musty.

When Mouldiness is seen, there is a natural Caution for the clearing it away; but there will be Mustiness when there is no Mark to the Eye: and Servants are often so negligent, that they seem to have the Sense of smelling given them to no Purpose.

We advise whoever intends to brew at Home, to look carefully himself into this Article. Let a Copper of Water, or two if needful, be boiled several Days before the brewing, and let the smaller Utensils be boiled in it, and the larger well scalded with it. Let them all be thoroughly and perfectly cleaned after the Scalding, and then scalded again: after this let them be exposed to the Sun and Air, so as to bleach and perfectly

perfectly sweeten, but not so as to crack them; and after this let them be set by for Use.

If every Thing be thus conducted, the Malt suited to the intended Kind of Liquor, the Water to the Malt, and the Quantity duly proportioned: if the Working be carefully heeded, and the Vessels clean, there can be no Doubt of the Whole succeeding to Credit and entire Satisfaction.

BOOK IV. PART II.

Of CYDER.

INTRODUCTION.

WE have gone through the general Account of the natural and artificial Products of the Farmer's Stock, and might here close that Part of our Undertaking: but as the Husbandman should never be without an Orchard, and as we would have him make every Part of his Ground turn to some Account, we shall advise him to make Cyder from the Produce of his Apple Trees.

Under this Head we are very happy, that we have an Opportunity of communicating to the Publick a Method, of raising this BRITISH Liquor to an Excellence which few know it can reach, and which renders it equal in Value to many Wines. This we receive from a Clergyman; a Gentleman of eminent Knowledge and distinguish'd Candour; and we have Authority to assure the Publick, that it contains nothing but the Result of Experience; that nothing is directed to be done, but what the learned and reverend Author has himself frequently practised, and does at this Time practise; and that the Result is his having Cyder superior to any other Person; and for which he has been offered in Exchange Quantity for Quantity of very valuable Wines.

As this is a Method never published, and the Account in some Parts refers to Things commonly known in the Cyder Countries, though they may be strange to the Reader in general, we shall prefix to it an Account of the usual and received Way of making this Liquor.

Those who chuse to practise the old Method, will therefore in this Place have full Directions for doing it; and those who shall follow our Advice, and attempt it upon the Rules prescribed

scribed by this valuable Correspondent; will, by having gone through the other Account first, perfectly understand every Process and every Part mentioned in this.

It is proper, in order to trace this Subject from the Beginning, to instruct the Farmer in this Place to plant his Orchard rightly. This falls very well in with our Plan in the present Work, the Intent of it being to instruct the Farmer in every Part of his proper Occupation. This is indeed a Subject we shall hereafter pursue through all its Branches, being determined to publish, after this Work is finished, a Compleat Body of Gardening in the same Form. The specious Appearance of other Works already extant under the like Names, is to us no Discouragement in this Undertaking; because partly the Papers in our Possession, many of which we find relate to Gardening, and partly our own Experience, have shewn us, that the most popular of those Works abound with Errors.

The same Hands which have compiled this Body of Husbandry, intending therefore to continue their Labours with the same Assiduity, to finish from the like Materials and the like Experience a Body of Gardening, we shall not on other Articles, confound or perplex the Reader, by mixing together two Considerations so naturally separate; but shall reserve to that succeeding Work what Directions we have to give with respect to planting Fruit Trees of other Kinds. Here we shall treat only of the Apple; and under that Head, in the usual Course of our Work, and according to our accustomed Method, we shall first teach the Farmer to plant an Orchard, and bring it to a bearing Condition: we shall then direct him, according to the usual Practice, to make the Advantage of Cyder from his Fruit; and afterwards lay before him these new discovered Methods for improving that Liquor.

CHAP. IX. *Of chusing a Spot for an Orchard.*

ALL that we direct the Husbandman to practise is, with a View of Profit. His Orchard we do not look upon as an ornamental, but useful Part of his Concern: and far from limiting it to the trifling Services of the Fruit at his Table: we intend it as the Source of very considerable Advantage in the Article of Cyder, which we shall give him the usual Rules for making, and afterwards these others, hitherto unpublished; which are vouched upon the most certain Authorities, Experience, and the Testimony of others of Knowledge.

If

If the Husbandman finds an Orchard upon his Farm, tolerably planted, and in a good State of Growth, he is to make the most of it in the Way we shall direct hereafter. If there be none, let him by all Means plant one, if he be fixed for a Continuance; and let the Land Owner never omit that Article. When the Orchards already planted begin to decay, this will be very well worth his while, and we shall here lay down the most profitable Method of doing it.

The first Consideration in the raising of an Orchard, is the Choice of a proper Piece of Ground. It is a Plantation that is to continue a great while, and that may be of very great Value hereafter, it is therefore worth while to be careful.

'Tis most convenient to be near the House, for the Advantage of gathering the Fruit, and for its Safety from their being stolen: but if there be not a proper Piece of Land near, it must be chose farther distant; for 'tis to no Purpose to have Convenience or Security where the Trees will not thrive.

Different Kinds of Ground will suit different Fruits; and if such a Soil as is suited to the particular Kind intended to be raised be not first carefully chosen, all the Expence and Care that shall follow will breed only Disappointment.

Let it be considered that Trees root deep; and accordingly let the Husbandman extend his Regard to the Nature of the Ground, farther than to what appears toward the Surface. Of all Soils for an Orchard intended for Cyder Apples, there is none comparable to firm, rich Loam.

As to what lies under it, let the Husbandman see that it be not a cold, tough Clay, nor a perfectly barren Gravel. Any other Bottom will answer, but in neither of these Cases the Trees will ever thrive. In the Case of a tough Clay Bottom, the Roots will always be chilled, and the Branches covered in the Moss: in Case of the barren Gravel, their Barks will crack or peel, and the top Branches will wither and shew what all the rest suffer tho' less visibly, that they are parched and starved for Want of Nourishment.

The Depth of the good Soil is a very material Article, for Trees spread out Multitudes of Roots sideways near the Surface; and the extreme Parts of these will fill all the good Soil be its Depth what it will: it is therefore of the utmost Importance that they be well supplied with Nourishment.

The next Article to the Soil is the Situation, for this is of great Consequence; and he is happy who finds the Advantages of both together.

An Orchard should neither lie on a Flat, nor upon the steep Edge of a Hill: if it lie in a perfect Flat the Roots will be chilled by too much wet, and it will want the Advantages of Sun and Air which higher Situations enjoy: and on the other Hand, if it be planted where the Descent is too great, little Wet will lie for the furnishing the Roots, and the best Part of the Soil will be washed away from them.

For these Reasons, the proper Piece of Ground for this Purpose is one that has a gentle Rising: here the Sun and Air have free Passage among the Trees, and enough Wet will lie for the Benefit of the Growth, but not enough to do Hurt. In the absolute Flats too much Wet lodges, the Consequence of which is the chilling of the Fibres, if there be no Sun to evaporate it; and if there be 'tis often worse, for the Quantity makes the Air foggy, and is the Occasion of Blights and many other Mischiefs, as we shall shew when we come to treat of that Matter.

Let the Husbandman therefore understand, that if he can find near his House a Piece of Ground that has a gentle Ascent, where the Soil is a rich, deep Loam, and the Bottom neither is a cold Clay nor a bare Gravel, he is very happy in a Piece for an advantageous Plantation.

There are certain Advantages of Shelter from bleak Winds, and Openings to the milder Air, which that Piece of Ground is always to be valued that has; but as this may always be given by a proper Plantation, let the Husbandman be sure, that if Nature has not given it, his Care and Industry do. The North and North East Winds are those which will be most mischievous in the Spring, and very frequently a North West in a more advanced Growth does great Damage; therefore let him plant in such a Manner about his Orchard, that it be perfectly defended from these Quarters, the North, the East, and the West; let it be open to the South to let in the Sun: and when all that is hurtful is blocked out, and all advantageous admitted in his Plantation, which before had all the Advantages of Soil and Situation, it will also have those of Sun and Air.

The Trees that are to defend the Orchard will grow up with the others, and all will thrive as they ought; only let the Planter in this, as we have warned him on all former Occasions, be careful not to run into one Disadvantage by his Earnestness in avoiding another: his Orchard is to be defended, but it is not to be blocked up. We have shewn the Disadvantages of this to all Growths whatever; and it is in none seen more than these. While the Winds are kept off, there must be

be a clear and free Passage for Air, or all will come to little. This is to be obtained by planting the Trees intended for Shelter and Defence at proper Distances, and trimming them in a judicious Manner as they grow; leaving on Branches enough to break the hurtful Winds, yet not so many as to choak the Passage of the Air. The Fruit Trees themselves must be planted also with a careful Regard to this Advantage.

C H A P. X. *Of disposing the Orchard.*

WE now enter on a Point less understood and worse practised than any Thing in the Husbandman's Profession; but we shall endeavour to lay down such Rules as will lead him into a better Tract. Let him observe, that we have said a free Passage of Air is of the utmost Consequence; it must have Liberty to go briskly between Tree and Tree, and to carry up all damp Vapours with it, else they will destroy the Hope of the Planter. Let him first take Care of this in the planting his Timber Trees for Defence. If there be rising Grounds towards the North East and West, they will defend the Orchards without other Help; and when they are wanting, let him plant his Trees for this Purpose far enough from the Fruit Trees, that they be not choaked up by them.

The same Caution is to be observed, that the Fruit Trees do not choak one another. Most Orchards are planted much too close. The Desire of having a great deal of Fruit upon a little Ground is the Cause of this, but the Method they take defeats the Purpose. They do not consider when an Apple Tree is planted to what an Extent its Branches will spread, or how far its Roots will run in the Ground. Let our Husbandman take Care of this; let him give Compass for the Roots that the Trees do not starve one another, and free Air-Room for the Boughs, that there may be clear Space enough between those of the several Trees at their utmost Growth for a Passage of the Air, Sunshine and Winds.

We have, on many other Occasions, spoken of the great Folly of close planting, but in these Trees it is worst of all: they spread farther, and they are to stand longer than others, so that 'tis an Error not to be remedied. We shall assure our Farmer, not on Reason only, but a careful Examination, that of the Orchards in general in most Parts of the Kingdom, if the Trees were but half as many, the Fruit would be a great deal more than it is from the whole. The natural Vapour of the Earth being pent up among close planted Trees will occasion Blights: but that is not all; the Perspiration of the Trees themselves

themselves is very great, and that joined with the Vapours from the Earth, will at the same Time hurt the Growth, and give an ill Taste to the Fruit: the Sun is a very essential Thing for the raising a Cyder Apple to its right Flavour, and that is not to be had where the whole is kept in Shelter by the Covering of the Boughs.

The Husbandman, who has an old Orchard, will do well to thin it by cutting away a great deal of the Heads of his Trees, that the Air may pass more freely; but in the planting a new one, another Sort of Caution should be used, for it is better to prevent than remedy.

We shall shew the Farmer that he would lose less Ground by planting his Orchard very distant than ever so near. In the Common Way of near planting, all the Ground is lost for other Purposes; whereas, if the Trees be set at great Distances, it may be tilled as other Land, and will produce Crops in the same Manner; and these, far from impoverishing the Trees, will, by the Culture of the Ground, cause them to grow quicker, to flourish more in every Respect, and to last longer. We have explained in treating of the Horsehoeing Husbandry, the vast Advantage of tilling the Ground while a Crop is upon it. This is a Benefit Trees will share in common with other Growths; and what we are now proposing is with Regard to them in all Respects, the raising them by the Horsehoeing Husbandry. The slight rooting Crops of Corn, sown in the Ground between them, do them very little Harm, and the breaking and dividing the Land by Tillage for these Crops, enriches them prodigiously; so that the Advantage is many Times greater than the Damage.

This then is the Plan upon which we advise our Farmer to begin his Plantation. He has chosen a Piece of Ground of proper Condition, and of sufficient Extent: it is defended properly, and yet open to the best Influences of the Air. All this serves for the Advantage of the Corn as well as the Trees; and let him consider the Piece therefore as a Quantity of arable Land, as well as an Orchard. This Caution only is to be given him, that he sow upon it none but the slight and shallow rooting Crops, as Corn, the Pulses, and the like: for the others would interfere with the main Design, and be every Way improper.

His Ground being thus chosen, let him make a Plan of it upon Paper, and mark the Places of his Trees. Let him dispose them in regular Rows; and let these Rows be thirty Yards asunder; and the Trees twenty Yards from one another in the Rows.

Such

Such a Plantation will have all the Advantages an Orchard possibly can enjoy. It will bear as much Fruit as it will be possible by any Art to obtain from an equal Quantity of Ground; and all the Time the Farmer will have the Benefit of it as so much Land like the Rest. In the first Year every Foot of it will bear as well as any other Ground; and when the Trees are fully grown, he will only lose the Advantage of a small Spot round each, which therefore it will be prudent in him not to sow: the Ground will all bear, except just under the Shadow of the Boughs.

C H A P. XI. *Of making the Plantation.*

THE Farmer having thus established in his own Mind, what is best for the planting his Ground, and to avoid Forgetfulness or Mistakes, having drawn the Plan of his intended Orchard on Paper, which indeed it requires no great Skill to do, he is to proceed to put this in Execution.

We will suppose it Spring, and the Ground he fixes upon to be a Piece that is in Pasture: let him not count so much upon the Profit of the Summer's Grass, as to defer the Work till it is got in or eaten off; this is a small Advantage in Proportion to what he is about. Therefore, early in the Spring let him plow it up, turning the Turf in that it may rot. Three Times in the Summer, at equal Distances, let it be plowed over again, to break and divide the Soil, to tear the Turf to Pieces, and to prevent the Growth of Weeds.

The last of these Plowings should be toward the End of SEPTEMBER; and this should be a very deep one, that the Ground may be prepared for the Reception of the Trees.

There are two Seasons for planting the Trees, and the Farmer should take no certain Resolution in Favour of one or the other; but be guided by the Weather, and the Nature of the Ground.

If the Soil be dry, and the Autumn favourable, any Time in OCTOBER the Trees may be put into the Ground: but if the Weather be extremely rainy, and especially if the Soil be inclined to Wet, then the best Season is the second Week in MARCH.

As to the Choice of the Trees, the great Article regards their Age: for in this many have run into a very material and very mischievous Error, by the planting them too large. It is certain, that an Apple Tree may be removed when of a considerable Growth, and that it will bear very well after it;

but it will neither bear so well, nor continue so long, as when planted young.

The best Age of a grafted Apple Tree for planting as a Standard, is at three Years from the grafting; and for this Use they should always be chosen upon a Crab Stock, for none is so lasting.

Let our Farmer examine the Ground from whence he has them: by no Means let him take them from a better Soil than his own: if he can have his Choice, let them be such as have stood on a Ground like his, but not so rich: their transplanting them will be natural, and they will at once take to the Land, and thrive apace in it.

Let a Stake be set up at every Place where a Tree is to be planted, and a large Hole opened for its Reception: let the Earth that is thrown out be well broken, and laid ready to put in when the Tree is set. A great deal of Hurt is done in these Plantations, by the Holes not being made large enough, and by the Earth being thrown in carelessly: when that is large, and the Ground that fills it is well broken, and is spread regularly, and settled by a gentle Watering, the Tree roots itself at once, and grows without any Check from the moving.

It is always best, when it can be done, to buy the Trees from a Nursery at a small Distance from the Place where they are to be planted, that they may not suffer by being kept long out of the Ground: and on all Occasions the more Expedition is used in planting them, the better; for they get Harm by the Air coming to their Roots.

When the Trees are thus brought into the Ground, one is to be laid by the Side of each Hole; and both the Roots and the Heads are to be pruned before they are put in: the best Way is to prune the Roots as the Tree lies, and the Heads as soon as it is planted: for the treading about the Roots in doing this afterwards, and the gentle shaking it gets in the handling, help to fasten and settle them, and the watering coming on upon that compleats it effectually.

In the pruning of the Roots the first Care is to look if any be bruised or injur'd in the taking up or Carriage; such are to be cut off a little above the bruised Part: after this let the Course and Manner of growing of those which are left be examined: it often happens that they cross one another, crush one another, and are thus very hurtful: in this Case one of the two must always be cut off just above the Place; and when the larger Roots are thus regulated, the Fibres must be pruned. These must all have their Ends cut off; and it should be done just before the putting them in the Ground,
for

for the Air always takes an Effect upon these slender Parts very suddenly.

If there be any decayed, mouldy or rotten Roots, they are to be cut off in the same Manner; for it is a Damage that spreads, and will infect the sound ones.

All being thus ready, let some of the fine broken Mould be scattered in the Bottom of the Hole, and the Tree set on it perfectly upright, and not too deep: then let the Rest of the Mould be thrown in a little at a Time, and the whole laid level and smooth at the Surface, when every Part of the Cavities between Root and Root has been filled up.

The Tree is now in the Ground, and the Head is the next Care. In old Time in ENGLAND Gardeners were afraid of taking off the smallest Shoot from a new planted Tree: at present the Fashion is opposite; the Gardener with his Knife is as terrible as the Surgeon with all his Apparatus of Instruments; and he thinks the more he cuts away the more he shews a masterly Hand: both Extrems are wrong. Indeed what Extream is not!

The new planted Tree will not be able to support so large a Head at first Setting, as it did while in the native Ground: but on the other Hand, if some be not left on, it cannot thrive. We have before acquainted the Husbandman how essential Leaves are to Trees; and he will therefore plainly see the Folly of cutting them all off with the Branches.

What he is to do is to take off a Part, and to manage his Knife in such a Manner, that what is left on may be of such Growth as to form a well shaped Head.

When the Tree is thus planted upright, and reduced to a proper Shape and Size in the Head, it is to be secured from Damage by Winds by staking. To this Purpose a strong Stake having been driven down near each Tree, the Stem is to be tied to it with a Hayband, or some other soft Substance, that will not hurt the Bark.

This done, the Plantation is secure: the Husbandman is to till the Ground between the Trees. They will grow up without his Care if the Seasons favour them; if not it will be proper for him to water them at Times, both the first and the second Year. The new Plantation will be starved by being left too dry; but there is no greater Mistake than the watering them too largely. In the first Case the fine and small Roots shrivel up and wither; and in the latter they are all rotted by the Abundance of Wet.

We have spoke of laying Stones about the Roots of new planted Forest Trees, to fix them and to keep the Ground

moist ; but we shall here propose a better Method for these Plantations.

Let there be a good Parcel of Turf pared pretty thick from a Common, and brought fresh into the Ground, and let a Quantity be laid down by the Foot of every Tree. Let a Labourer carefully spread this round the Bottom of the Stem, laying the Turf Part downwards, and then covering the Ground with it two Feet each Way from the Tree. This needs not set aside the Use of watering, for it will make it answer much better, because the Moisture will be detain'd as long as it ought, and this Turf may be afterwards dug in as a Manure.

C H A P. XII. *The general or common Method of making Cyder.*

WITH Respect to the Choice and Kinds of Apples, their Mixture and peculiar Management, we shall refer the Reader to the subsequent Chapter. We are not here entering into Particulars, but delivering only the general Method, and universal Rules ; that the Process of Cyder making may be understood in itself, and consequently the following Account be understood without Hesitation.

The Apples intended for Cyder must be picked clean, and their Juice expressed or squeezed out. The picking them is as easy as well as a needful Article ; no Filth or Foulness of any Kind must be mixed with them ; and if there be any decayed ones among them they must be thrown away.

The picked Apples are to be put into the Mill, where they are mashed and ground to Pieces by a Stone moved round upon them : this is the proper Method for large Quantities ; but any Method of bruising and squeezing them thoroughly will do.

The Juice of the Apples being thus squeezed out, is to be caught in proper Vessels, and as some Foulness will have come among it, it must be strained. A tolerably close Hair Sieve answers very well for this Purpose, or a Canvas Bag may be employed, or any other Contrivance that will let the Juice run freely through, and keep back the gross Particles.

The Juice thus strained from Impurities is to be put into a Vessel, which must not be quite full. It is to be covered loosely, and set quietly by for three Days.

At the End of that Time it is to be covered up as tightly and closely as may be with Clay ; and then the Business is to watch for its growing fine.

This

This is to be known only by trying from time to time. To this Purpose a small Quantity is to be drawn out once in a Day for two, and examined in a Point of Clearness. When it is sufficiently clear, it is to be pierced for a more certain Examination of the whole.

In this Respect we are to inform the Farmer, that he is to consider his Cyder according to the Nature of the Apples under three Kinds. These may be named according to the Apple; 1. The Summer Fruit Cyder; 2. The Gennet moil Cyder; and 3. The Redstreak Cyder. These have their three several Times at which they may be naturally expected to arrive at this Degree of Fineness: the Time of the Summer Fruit Cyder is about a Month; the Gennet moil Cyder seldom comes to it till towards the Beginning of OCTOBER, and the Redstreak Kind not till JANUARY.

These are not to be supposed certain, invariable, and universal Rules, for there can be none such. The Weather, the Temperature of the Air, and the Degree of Ripeness of the Fruit, all these singly, and two or more of them together, will naturally make very great Variations. Sometimes a Quantity of Cyder will be fine sooner than could be expected: frequently it takes a Fortnight longer for the Summer Fruit Kinds, and a Month or six Weeks longer than the natural and usual Time for the others.

In general the Winter Fruits of all Kinds are to be expected to answer in the Manner of the Redstreak, and when after a Month, or at the utmost six Weeks more than the usual Time, they are not grown fine, they must be racked off as clear as may be in the Manner of Wine.

Many Expedients have been used to fine down the Cyder that does not answer as it should, but most of them are very improper. There is however one eminent Ingredient, that is of excellent Service to this Purpose, and may be used with perfect Safety. This is, Isinglass. It is a very harmless Drug, and when dissolved is of such a clammy Quality that it lays hold of all Kinds of Foulness; and when the Fault is not too great will carry all down with it, and leave the Liquor perfectly fine.

As we have named this Ingredient, we shall inform the Farmer how he is to use it, for there is nothing so generally mistaken. Isinglass is brought from the Northern Parts of EUROPE, where it is made by boiling the sinewy and skinny Parts of a Fish, much like a Sturgeon, to a Jelly; which is then poured out upon a Table to dry, in the same Manner as our Glue is made.

The

The common Method of the Country is not to cut it out into flat Cakes, as we do our Glue, but to roll it up into long Pieces, which they double together in the Shape of an Iron Staple.

This is the Shape in which Isinglass comes to the Druggists, and they are ready enough to sell it in this Form: but this is not the Way the Farmer is to buy it. These large Lumps are very hard to dissolve; but when it is beaten out into thin Shivers, it will melt in any Liquor that is not too strong, without much Difficulty.

Water dissolves it best, because it has been boiled up in Water; but this is not the right Method for Cyder, because the Addition of any Water will impoverish the Cyder, and therefore have a just contrary Effect from the fining of it, any thing that weakens a Liquor of this Kind naturally rendering it cloudy.

For this Reason the best Way is to dissolve the Isinglass for the present Purpose in a good bodied white Wine. As this is a stronger Liquor, the Isinglass will not melt so freely in it, therefore there is the more Occasion to buy it in a proper Condition. Let the Farmer who wants this Drug therefore, see that he ask for beaten Isinglass, and that it be well beaten into thin Shivers. Then he is to put it into the Wine for fining down the Cyder.

It will be fit for Use as soon as it is thoroughly melted, but not before: this is a thing that is done slowly; some hasten it by Heat, but that is not so well. If the Wine and Isinglass be set over a gentle Fire, and kept stirring, it will in some little Time melt; but thus the Wine loses a great Part of its Spirit, and often the whole gets a burnt Taste. This is to be guarded against in the most careful Manner; if the Necessity of the Farmer's Affairs make him use the Way with Heat, but the better Way is to take a proper Time, and let it dissolve in the cold.

The fine beaten Isinglass is for this Use to be put into a large Bottle, two thirds filled with Wine, and set by in a Cellar. It is to be shuck gently from time to time, and by Degrees it will perfectly dissolve, and the whole will make a fine Jelly. This Dissolution is much more perfect than that with the Help of the Fire, and it always succeeds much better when put to Use.

When the Cyder is thus made fine by an innocent Addition, or when it has, in the common Course of Time become fine of itself, it is to be drawn off at Pleasure and bottled if the Farmer chuses.

This

This is the common Rule for making Cyder ; and by this the Reader who had not before been acquainted with the Subject, will know the Nature of the general Practice. This being premised, we shall give the Reader the new Improvements of the Gentleman we have before mentioned.

C H A P. XIII. *The Reverend Mr. GEORGE TURNER'S Method of making Cyder.*

AS we are here about to present the Reader with a compleat Treatise on this useful Subject, obtained from its Author at some Expende ; and as we hope very well worthy the Publick Attention, it may not be improper to prefix to it what we have been informed concerning its Contents.

The first Notice we received of this Treatise was in a Letter from Mr. PENROSE, of PENRYN in CORNWAL.

This Gentleman acquainted Mr. OSBORNE, one of the Proprietors of this Work, that Mr. TURNER, Clergyman of that Neighbourhood, greatly respected for his Learning and Integrity, had written such a Treatise from his own Experience ; which he apprehended might be procured for the Service of our Undertaking. Upon this Gentleman's acquainting the Proprietor's farther, that the Author had lived many Years in the SOUTH HAMS in DEVON ; that he had great Experience in the Subject, and his Rules, so far as they had been communicated to the Cyder-makers, had been greatly approved and followed ; and that the Treatise itself, though never published, had received the Approbation of the late great Doctor MEAD, and had, at his Recommendation, been read before the ROYAL SOCIETY, and universally approved ; he was requested to obtain it from the Author on any reasonable Terms, that a Piece of so established and authenticated Credit might not be lost.

In Consequence of this Commission we have been favoured with the Essay, which we here deliver to the Publick as it comes to us, with this additional Recommendation, that the Author of it, who lived fifteen Years near TOTNESS, and had always the Reputation of making the best Cyder there, had since his Removal into CORNWAL introduced his Method so happily, that the Cyder of that County, which never had been of any great Credit before his coming thither, is now advanced to such a Degree of Perfection, that the DEVONSHIRE People, of the most famous Cyder Places, acknowledge they have none equal to it.

We have the Pleasure to receive also with the Treatise this farther

farther Testimonial of its Worth, that the Right Honourable the Lord EDGECUMBE, Mr. HOBLYN, and many other Noblemen and Gentlemen of distinguished Knowledge, who had read it in Manuscript, were desirous it should be printed for the Publick Good.

To these Testimonials of the Worth of the Piece, we have only this to add, that it is published entire, at the express Instance of the Author. We should have given the Reader only the practical Part of it, according to the Nature of this Work; but the express Condition on which we received it was, that it should be published exactly from the Manuscript, without Addition, Diminution, or Alteration. We did not think it justifiable to deprive the Publick of a Piece recommended to us under the Countenance of such great Names, on any scrupulous Strictness of that Kind; and having accepted it under this Condition, we have no Right to violate the Engagement.

The Treatise follows literally from the Hand Writing of the Author.

ENGLISH LIQUORS best suited to ENGLISH CONSTITUTIONS:

O R,

AN ESSAY ON CYDER.

Directions how to order the Fruit: how to make, manage, and improve the Cyder to the best Advantage: how and when to Bottle it: and even how, and when, to drink it too, for Health as well as Pleasure.

By GEORGE TURNER, A. M.

Vicar of MILOR, in the County of CORNWALL.

P R E F A C E.

THE Rules laid down in the following Essay, for the Management of Cyder, have received the Approbation of an Honourable Society; as being founded on Nature, Reason, and Experience.

Although

Although I have no right to mention the Name of the worthy Member, who recommended this Essay to the Notice of that learned Body: yet I cannot conceal, that he stood for many Years, at the Head of the Profession of Physick, and even to the Time of his Death. As the Rules themselves were at first drawn up at that Gentleman's Command (for I took his request to be such) and almost in the same form of Words, in which they are now presented to the Publick, so that induced me to borrow so many Allusions from the Practice of Physick. What Mistakes I might be guilty of in touching upon the Medicinal Art, I had received such Marks of Friendship from him, as gave me fair Hopes of being entitled to his Correction. And I am strongly convinced, from repeated Observations in both Kinds, that the Fermentation and Cure of Cyder cannot be better illustrated, than by some particular Symptoms discernable in Human Bodies.

But its being manifestly calculated for the Benefit of my Native Kingdom, is that which hath rendered this little Treatise on Cyder acceptable to some others of my judicious Friends, as well as to the Gentleman above: for as their Hearts are entirely English: so they would no more consent that the Health of their Countrymen should be impaired by French Liquors, than that their Understanding should be subject to a French Religion.

As for those who are already captivated, both in Body and Mind, and who will swallow French Brandy in spite of their Experience, as they do French Principles in Defiance of their Reason, I do not pretend to reclaim them: their Constitution, in each Capacity, is broken, and they are past a Cure. The Sight of Multitudes dropping into their Graves, through an immoderate Use of strong Spirituous Liquors, can no more convince them of their pernicious Quality, than they can be persuaded of the monstrous Absurdity of Transubstantiation itself; which goes down smoothly with them even against the palpable Conviction of their own Senses.

But let such Soakers be upon their Guard: for they can no more blame the FRENCH Merchants for smuggling their Brandy, than they can find Fault with our ENGLISH Apothecaries for vending Arsenick. It is a Branch of the Business of both: and if some get their Death by an indiscreet Use of that whereby others procure their Livelihood, the Fault is entirely their own. If they will continue to drink Brandy in Spite of Fate, when they are assured that an immoderate Use of it is perfect Poison; their Bane is of their own seeking, and they must take the Blame, as well as the Harm, to themselves. They fall an unpitied Sacrifice to their own Folly; and become the Jest and Derision of those who sily furnished them with Materials for their Ruin. For as the County of CORNWALL, by running out into a narrow Peninsula

*Peninsula betwixt two Seas, doth not afford us any considerable Rivers; so the FRENCH very merrily, but sarcastically, retort upon us for the frequent Cargoes of Brandy they furnish us with: that they know not what Use we can make of such a vast Profusion of that Liquor every Year; unless it be to drive our Corn, and stamping Mills with it for Want of Water. That I might take an innocent Revenge upon them, the Design of the following Dissertation is to rectify the Manners of my Countrymen, as well as to cure their Cyder. To convince my Neighbours of CORNWALL in particular, (who lie most exposed to Danger) that they sacrifice every thing valuable, (their Health, their Wealth, and their Reputation) to the Whim of an ungovernable Appetite. That Providence * hath been vastly kind to us; and that we want nothing but Innocence and Temperance, to render our Lives as happy and comfortable, as they may thereby become long and durable. That the Liquors of our own Growth, and the Juice of the Apple in particular, if well managed, would supersede the Use of foreign † Wines, and prove more conducive to Health than any of them.*

If this Essay hath its desired Effect but upon the two Western Counties of CORNWALL and DEVON, I shall be content, for their Sake, to draw the Displeasure of the whole Kingdom of FRANCE upon me; especially at this favourable Conjunction, when the whole Navy of ENGLAND stands ready to guard and defend the Rights of GREAT-BRITAIN, both at Home and Abroad.

Milor, January 29. 1756.

* Rejoice, O BRITAIN, sever'd from the World
By Nature's wise Indulgence. Indigent
Of nothing from without: In one Supreme
Entirely blest; long may he reign!

† — Choice Nectar, on which always wait
Laughter, and Health, and Care-beguiling Wit,
And Friendship, chief Delight of human Life!

What shou'd we wish for more; or why in Quest
Of foreign Vintage, insincere, and mixt,
Traverse th' extremest World, when native Land,
Imparts from bounteous Womb annual Recruits
Of Wine delectable; that far surmounts
GALLICK or LATIAN Grapes. And shall we doubt
T' improve our vegetable Wealth? which will supply
What frugal Nature asks. —

Mr. PHILIPS's Poem on Cyder.
IN

1. **I**N the Improvement of Cyder, the first Rule to be observed is, that all the Apples be permitted to drop from the Tree; that they may have the full Benefit of the Stock on which they grew, and of the Sun their Foster-Father: for by striking down the Fruit before it is ripe, the Buds are struck off with it, the Tree is injured, and the Cyder that is made is tart and harsh, for Want of Time to meliorate the Juice.

2. Let your Apples (especially in windy and tempestuous Weather) be gathered up once or twice a Week, and thrown together in some secure Place without Doors; for hoarding the Fruit in a House is apt to give the Juice a musty Taste, for Want of a free and open Air. It also prevents the Cyder from quick refining, by rendering the Juice flat, dead, heavy and unapt for Fermentation.

3. Let your Apple-Heap be made on slanting and open Ground towards the South, that the falling Rains may fleet from it, and that your Fruit may be exposed to the Eye of the Sun.

4. To erect a slight Covering of Reed over the Apple-Heap, supported by four tall Sticks, will be very proper; the fore and higher Part of the Covering fronting the South. By the Shed so contrived and situated, your Fruit may at once have the Refreshment of the Air, be defended from Rain, and be also visited by the Sun. But let the Bottom of the Apple-Heap be covered, or paved with broad Stones, and edged round with the like Sort, to keep the Fruit clean and close together.

5. Let your Apples lie in the Heap a longer or shorter Time, according to the Nature of them. Mediates, for Instance, being of a hard Kind, and their Juice austere, do require a Month in the Heap, or more: whereas White-Sours, being of a softer and more early Sort, a Fortnight, or less, for them may be sufficient. But the Time for each must be proportioned to the Ripeness of the Fruit, and to the various Dispositions of the Air and Weather. For, according to the Quality of the Fruit, and the Temperament of the Air, the Apples run sooner or later to Decay.

6. When your Apples are pounded, let the Muck lie a Day before it is squeezed. It will improve the Colour of your Cyder, and render it of a deeper Complexion.

7. If you make a Tun of Cyder at one Time, and have a Vessel large enough to contain it all, it is a good Way to keep it together: that it may all become fine at the same Time, and be fit for racking.

8. When

8. When your Cyder is fine, (which it sometimes happens to be within a Day or two, especially upon a dry, * Northern, or Eastern Wind) then, by a Cock placed within half a Foot of the Bottom of the Vessel, always allowing Room for the Dregs to settle in; it must be racked off into Hogheads.

* *The hoary Frosts and Northern Blasts, take Care,
Thy muddy Cyder to refine, and drive
Precipitant the baser, ropy Lees.*

PHILIPS.

But although Cyder be rack'd never so fine at first, it will ferment again and become foul, especially in rainy and tempestuous Weather, and upon southern and western Winds; (just as the Humours in a Man's Body are set on float, and put in Motion when the Winds are in the same Position; and therefore Laxative Potions are wont to be administered at such critical Conjunctions) and then your Cyder may require several Rackings before you give over your Care about it: for all wet Seasons are injurious to new Cyder, by causing a constant Fermentation for a Month or six Weeks, and longer too, if the rough Winds and foul Weather do so long continue. You must therefore be very observant of them, and watchful against them, by frequent racking, whether your Cyder be fine or not; in order to prevent its over Fermentation, and to keep it quiet.

9. Let this be a standing Rule for your first racking: namely, to set about it when the thick, red Head, or Crust, which covered the Cyder, (like a Mantle upon a Patient under a Course of Physick) that so by its kindly Warmth a Fermentation may be promoted, begins to separate, and white Bubbles do appear. For although your Cyder be foul at that very Juncture, it is yet very proper to rack it: otherwise your Cyder (like a Man wasted by an incorrigible Diarrhoea, or a violent Super-purgation) may become incurable: for it will then (especially in wet Weather) instead of a gentle Fermentation, be put upon the Fret, and (in the SOUTH-HAM Phrase) sing; the wild Notes whereof may be heard at a considerable Distance) till it becomes * pale, thin and languid; and (like the Swan) hath sung itself to Death.

* *Cyder of pallid Hue declares the same
Devoid of Spirit: wretched be that quaffs
Such Whetish Liquors. Oft with Cholick Pains,*

WILL

*With pungent Cholick Pangs, distress'd he'll roar.
And tofs, and turn, and curse th' unwholesome Draught.*

PHILIPS.

A critical Racking, therefore, is like a critical Bleeding in a Fever ; or a well-timed Cathartick, Emetick, or Clyster in a violent Fit of the Cholick ; and both the Liquor and the Patient are preserved by Evacuations adapted to their respective Disorders.

10. To prevent Waste in racking, and, at the same Time, to dispose Cyder for becoming fine the sooner, Recourse must be had to Percolation.

Get Flannel enough for five or six Bags, each containing five or six Quarts. Let these Bags be made of a conical Figure, like a Sugar Loaf, or what the Gentlemen of the Faculty do affect to call by their Master's Name, the Sleeve of HIPPOCRATES : (as if the Prince and Father of Physicians had carried some of his Art in his very Cloathing, and so his Disciples pinned their Faith upon his Sleeve in a literal Sense.) Let the small Ends of these Bags hang downwards, that the Cyder, by its impending Weight, may the sooner be impressed through them. Let the upper and open Parts be edged or bound round with Inkle ; that they may the better support the Weight of the Liquor.

11. When your Bags are thus prepared, get a strong Hoop, and having fastened two Sticks across in it, tie up your Bags to them. The Centre, where the two Sticks meet, having a Rope fixed to it, and the Bags being made to hang perpendicular over a large Vessel, pour that Cyder into them, which remains at the Bottom of each Hogshead after racking, and which is too foul to be mixed with the rest. By this Method Abundance of Cyder (and fit for common Use) may be preserved, which must otherwise have been thrown away with the Lees.

12. An empty Hogshead must be kept on purpose for the Reception of the percolated Cyder, into which it must be thrown from Time to Time, as soon as it is strained. The Cask must be closely bunged, as often as the Cyder is thrown into it, lest the Liquor become flat by being too much exposed in an open Vessel. The percolated Cyder must also be racked, when there is a good Quantity of it together, and it is become tolerably fine.

13. To adapt your Cyder to all Palates, you may, either at your last Racking, or just before you bung and stop it up,

* mix several Sorts together, and so render your Cyder rough or mellow, to what Degree you think fit.

** There are that a compounded Fluid drain
From diff'rent Mixtures, and the blended Streams
(Each mutually correcting each) create
A pleasurable Medley, of what Taste
Hardly distinguishable.*

PHILIPS.

14. By thus mixing your Cyder, you may give all that you intend for your own Table, the agreeable Taste of the White-Sour. The Juice of this Pom-Royal being of such a predominant Quality, as to communicate its Flavour, in a very distinguishing Manner, to all the Cyder with which it is in any due Degree mixed, Providence seems to have ordained it for this very Purpose.

I know, indeed, that in the Parts about MODBURY and KINGSBRIDGE, in DEVON, where the White-Sour Fruit doth much abound, the People are more tormented with the Gout, than in any other Part of the County. This they attribute to the Use of White-Sour Cyder. But ought they not rather to impute their gouty Complaints to their Groust Ale of several Sorts, with which those Parts do more abound than any other! Are not these Liquors too foul to have a clear Passage through them; and what becomes of their foul Contents? Must they not of course rack and torment the Bodies that harbour them?

But, if these Gentlemen are so in Love with their Grousty Liquors, as not to perceive the Mischiefs they suffer from them; (for, of all fermented Drinks, those of the Groust Kind seem to be the worst) if they are resolved to acquit the guilty, let them not be so unfair, as to condemn the innocent. Before they appear in open Rebellion against this King of Cyder Fruit, and take up Arms to lop off the Heads of their White-Sour Trees, and to graft them to another Kind, (which, I am told, they are confederated to do after many Years Mutiny) it is no bad Advice to them to suspend their intended Hostilities, and to try the Difference, by racking their White-Sour Cyder more, and by drinking less of it unmix'd than they are wont to do. If these tender-footed Gentlemen do really find their White-Sour Cyder potent and searching, even after they have well subdued it by racking; one Hogshhead of it (like what the Merchants call their Full Wine) will serve to improve two

of another Sort, and to render all three more fit for their own Tables at Home, if not for the Markets Abroad. For White-Sour Cyder communicates its Virtue and Flavour to other Juices, as a merry Companion doth Life and Spirit to every Member of the Society in which he is engaged. And who would fall out with a Liquor so friendly and diffusive of its Favours, as to distribute them thus frankly, and without Reserve, for the common Good?

15. Various are the Practices of People in stopping up their Cyder; some doing it early, and others leaving it open till CHRISTMAS, and longer, if the Weather continues mild, or the Frost be not severe.

As I have fully experienced both Ways, so I must give my Judgment in Favour of the latter. Due Regard ought, however, to be had to the Nature of the Fruit, and to the Time of pounding: for as the Cyder which is first made, may, at CHRISTMAS, be twice as old as the last pounding; so coming from a more early Fruit, and therefore sooner discharging its windy Effluvia (the only Use and End of its being left open at all) it ought, for that very Reason, to be the sooner bunged up.

16. While your Cyder continueth unstopped, a slight and loose Covering of Board, which may reach from Hoop to Hoop, ought to be put over the Bung-Hole, to prevent the Dust, Rats, and other Annoyances, from breaking the thin Film, or unctuous Substance, which investeth the Surface of the Cyder; as a Guard intended by Nature for its Preservation, like Oil upon a Flask of FLORENCE Wine.

17. Especial Care must be taken also to fill the Hogshead to the very Top of the Bung-Hole, at the last racking; that if any light or flying Lees remain in the Liquor, they may be removed at the Bung; for this is frequently the Case of mellow Cyder: and if those Lees are permitted to remain in it, the Surface of them, by being exposed to the Air, will become sour. That Tartness will by Degrees render all the Cyder (whether it be in a Hogshead, or in a larger Vessel) of the same Complexion. Yea, the Taint may be perceived to descend gradually: for while the Cyder is sour at the Top, it is found a few Inches below it; till (like the Palsy, which takes its Rise from the Capitol, or Brain, the Seat of the nervous Stock) it descends from Head to Foot, from Top to Bottom.

18. This is the grand Article in which People are wont to be deceived, and by which they are rendered out of Love with racking of Cyder, how much soever they are pleased

with it, when it happens to answer their Wishes: for when their Cyder turns sour, they are so weak as to imagine that racking takes away the Spirit of it, and that it must then become sour of Course, for Want of a Body to support it, as they are wont to speak: whereas, in truth, it grows sour for Want of Skill how to secure it after the last racking; by removing the light Lees which swim on the Top of the Liquor, before they acquire any the least Degree of Acidity from the impending Air, to which the Cyder is exposed. And if the Hogshead is not full, or the Bung-Hole is not large enough to admit the doing of this by a Spoon, the Cyder must be racked again, though it be as clear as Rock-Water, or as fine as Amber: And Racking indeed is the surest Way; for some of the Lees may escape the Spoon, and therefore there is no certain Dependence upon it.

19. And under the Article of Racking I must moreover observe, that the Person employed in racking your Cyder, must be particularly careful to wash and dry his straining Bags, racking Tubs and Buckets, lest they cast a sour Look upon him at the Time of his next Racking. He must be as neat in his Cellar, as a Maid in her Dairy. No more Marks of a Sloven must appear in the Vessels of the one, than of a Slut in the Utensils of the other. For Want of this Precaution, as the Dairy abounds with a worse than CORNISH Sour-Milk; so the Cellar is stock'd with a despicable Sort of Vinegar.

20. The Season for * bottling of Cyder for the second Year's Use, (as that of the White-Sour, Mediate, Redstreak, Fox-Whelp, and others of the strongest Kinds) is at the End of AUGUST, or in the Beginning of SEPTEMBER; that the remaining Heat of the Season may give it just Briskness enough to preserve it the following Winter.

* *Cyder in Bottles frail improves and smoaks
Transparent, sparkling in each Drop:
Delight of curious Palates, by fair Virgins crav'd;
Fallacious Drink! ye fair Maids beware,
Nor trust its Smoothness: the third circling Glass
Suffices Virtue. But may perfidious Filts
(That slyly speak one Thing, another think,
Hateful as Hell) pleas'd with the Relish weak,
Drink on unwarn'd; till by enchanting Cups
Infatuate, they their wily Thoughts disclose,
And through Intemp'rance grow awhile sincere.*

PHILIPS.

Cyder

Cyder thus ordered will be a prudent Reserve against a Year of * Dearth, and stand good for several Years: longer, perhaps, than the Owner's Curiosity can prevail over his Appetite to keep it.

* — *Else if the following Years
Exhibit no Supplies, alas! thou must
With tasteless Water wash thy droughty Throat.*

21. But Regard must be also had herein to the Difference of Climates. My warm Situation (for Instance) in the Southern Part of the County of CORNWALL, near FALMOUTH, doth oblige me to defer bottling of Cyder till the End of OCTOBER, or the Beginning of NOVEMBER; and even then to let the Bottles remain uncork'd for several Days: otherwise (although I do not bottle my Cyder till it be two Years old) my mellow Cyder would burst most of the Bottles; and thus (like a Chymist who hath laboured several Years in Search of the Philosopher's Stone, and put all his Materials into a weak Crucible, as the last and finishing Process of his Skill) I should be undone by the cracking of my brittle Ware, and ruined by my own Art.

22. My costly Experience this Way hath taught me also not to fill the Bottles higher than the Bottom of the Neck, even with rough Cyder, and lower still with the mellow Sort. Hereby Room is left for the subtil and volatile Particles to play, and expand themselves in the empty Space, without breaking the Bottles.

As for the Experiment of a certain judicious Naturalist of the present Age, in putting a small Piece of round Cork into each Bottle, for Prevention of Mischief, I never tried it. For if the Cork happens to be musty, or the Parts of it to be separated in the Bottle, it will either prove an Injury to the Liquor, or be an Eye-Sore in it. But it calls to my Mind a beautiful Comparison of a late celebrated Writer; namely, that a great and able Statesman out of Business, is like a huge Whale, which will overset or dash in Pieces a large Ship, if he hath not a light, empty Cask to play with.

23. That your Stock of bottled Cyder may be kept from Leakage, the Corks must be tied with strong Pack-thread.

The Bottles ought also to be laid upon their Sides, that the Air may not find its Way by the Cork, so as to hurt the Liquor. The same Caution is needful in all other Liquors, except distilled Spirits, and a few Sorts of the most potent

White-Wines. But when the Bottles are placed on their Sides, Care must be taken to decant the Liquor with the same depending Side downward on which the Bottles lay in the Cellar, that so the Sediment may be left behind.

24. And thus I have finished that Part of my Essay which relates to the ordering of the Fruit; to the making, managing and improving of the Cyder to the best Advantage; and to the Rules proper to be observed in bottling of it, and in decanting of it, so that it may be presented to your Friends at the Table in the most elegant Manner.

To lay down Rules to People, how and when to drink their Cyder for Health, as well as Pleasure, may be deemed a needless Undertaking; because they will tell me, that every one is the best Judge of his own Constitution.

But as the Design of this Essay is to rectify the Manners of my Countrymen, as well as to cure their Cyder, so I must here observe, that although Cyder, when well cured, be both a healthful and pleasant Liquor, and is therefore well adapted to an ENGLISH Constitution; yet it is not to be drank at all Times, and by every Person that can swallow.

There are two Sorts of People to whom I ought in this Place to address myself; I mean those who will not drink Cyder, and those who cannot forbear turning Sots upon it.

I am very sensible, that many of those of the better Rank, who have been accustomed to the Juice of the Grape, have their Judgments so perverted, and their Palates so vitiated, that they cannot condescend to the Use of this common plebeian Liquor, because it is ENGLISH.

And it may well be pleaded indeed in Excuse of their Prejudice, that good Cyder being the Production of but few Counties in the Kingdom, even those which do most abound with it, have it so often * adulterated with Preparations of Treacle,

* *This I warn thee, and shall always warn:
No Heterogeneous Mixture use; as some
With wat'ry Turnips have debas'd their Wines,
Too frugal. Nor let the crude Humours dance
In heated Brass, steaming with fire intense,
Altho' CORNUBIA much commends the Use
Of strength'ning VULCAN. With their native Strength
Thy Wines sufficient other Aids refuse:
And when th' allotted Time is run compleat,
Are more commended than the labour'd Juice.*

PHILIPS.

Treacle, boiled Sugar, Brimstone, Isinglass, Cochineal, boiled Cyder, and a Number of other Ingredients which I could mention; that, instead of being an innocent Liquor, (as it is in itself) it becomes a very offensive one. For while such over-busy Practitioners do only study how to please the Eye, and to cheat the Palate, the Stomach (which ought to be chiefly regarded) is entirely neglected. Whereas, by attending to the plain Dictates of Nature, and narrowly watching her Operations, they might keep their pernicious Train of Ingredients and destructive Artillery for other Purposes; and render their Cyder more agreeable to the Sight, more delicious to the Taste, and much more wholesome to the Stomach without them.

On the Score of the many Tricks practised upon Cyder, it was that I drew up these Memoirs some Years ago, at the Instance of that worthy Member of the Royal Society, of whom I have given some Intimation in the Preface. That Gentleman had studied Nature very narrowly; and as he reckoned Cyder the most healthy Liquor of any, and was determined to confine himself to the Use of it, and to have it managed under his own Eye, that he might preserve it genuine; so he might well confide in my Sincerity at least, as to the Rules of doing it. Of these I gave him a Specimen in a personal Conference at his own House; and was really as anxious for the Preservation of his Health, as he had before shewn himself truly judicious in prescribing Means for the * restoring of mine.

* ————— *What Returns.*

*Of Thanks were due to his Beneficence
Freely vouchsaf'd, when to the Gates of Death
I tended prone? If his indulgent Care
Had not prevented, with unbody'd Shades
I now had wander'd, and these emty Thoughts
Of Cyder perish'd. But, up-rais'd by him,
Each Day and Night my Duty I repay'd
In grateful Task his Liquor to amend,
And render pure; as he had done my Blood.*

*The honour'd Name of M—— shall still employ
My Thoughts, and dwell for ever on my Tongue.*

I might, from this Passage, take Occasion to enlarge upon the Virtues of Cyder, as a good Diuretick, Pectoral, and even a Cooler of the Blood too, as well as a Diluter of it, when taken in a moderate Way. But this is the Physician's

Province, not mine. I only undertake the Cure of the Fermentation of Cyder, not that of the Blood and Humours.

But as Cyder is allowed by the Gentlemen of the Faculty, to be a good Antiscorbutick also; and hath been known to continue sound through an EAST-INDIA Voyage: yea, to become better by twice crossing the Seas to and from that remote Part of the World; and to * imitate the Taste of several Sorts of Wine: so I have often wondered that the Board of Admiralty have not, till of late, directed the Use of it to his Majesty's + Navy; and that Maritime Persons in the Merchants Service too, when bound upon long Voyages, should set out from their respective Ports without a competent Stock of it,

* *Some Cyders have, by Art or Age, unlearn'd
Their genuine Relish, and of sundry Wines
Assum'd the Flavour. One Sort counterfeits
The Spanish Product; this to Gauls hath seem'd
The sparkling Nectar of Champagne: with that
A German oft hath swell'd his Throat, and sworn,
(Deluded) that imperial Rhine bestow'd
The generous Rummer. Whilst the Owner pleas'd
Laughs inly at his Guests thus entertain'd
With Foreign Vintage from his Cyder Cask.*

PHILIPS.

+ *Where'er the Britons navigate their Ships,
Diffusive to the utmost Bounds of this
Wide Universe, the British Cyder borne,
Will please all Tastes, and triumph o'er the Vine.*

PHILIPS.

Much might be advanc'd in Commendation of Cyder, and in Point of Health, to gain it the Preference to Foreign Wines, how neatly soever they are said to be imported; yea, though they are found to answer too that Character of the inspired Writer, namely, to make glad the Heart of Man. For all Wines abounding with tartarous Salts, and the Fermentation of them being quieted, while their Spirit is raised by a Mixture of Brandy in their Cure, the frequent Bibbers * of them do contract the Seeds of the Gout, Gravel, Scurvy, and other Maladies, to which this our BRITISH Wine doth not render us obnoxious.

* *I need not tell what dreadful Ills attend
Immoderate Use of Wine: nor all the Kinds*

Of

*Of Maladies that lead to Death's grim Cave,
Wrought by Intemperance: Joint-racking Gout,
Intestine Stone, and pining Atrophy.*

PHILIPS.

I must not here omit the Names of two eminent Physicians, viz. Sir JOHN FLOYER, and Dr. BAYNARD: the former of whom found much Benefit in a severe Asthma; and the latter owed his Life twice, when in a most deplorable and confirmed Phthisis, or Consumption, to the Use of Apples and Pomaceous Juices.

And if this Fruit was not the Growth of ENGLAND, but the Production of the INDIES, it would, probably, upon the Strength of such Authority, have been celebrated more than it is in our Dispensatories, by QUINCY, ALLEN, JAMES, and the Writers in that Way: be brought over to us either dried or in Conserve, have a top Place in Physical Prescriptions, and be closeted by the Apothecaries among their other rare and costly Drugs.

For that Apples are great Preservatives, as well as good Restoratives of Health, let the several Instances quoted by the said Dr. BAYNARD suffice to shew. Among other Things in Commendation of Apples, he tells us, in his History of cold Bathing, p. 314, of a Gentlewoman and her three Sons, who Came to HOLLAND, from somewhere near POMERANIA, to claim an Estate which fell to them as next Heirs, by the Death of some Relation: and that the Sons, as well as the Mother, were so very old, that, betwixt them all they made up four Hundred and thirty-seven Years. For what the younger were short of a Hundred, the elder were above a Hundred; which compleated the same Number of Years. Whether they lived a Century, or more, beyond that Term, our Author doth not say. But when their Way of Living, as to Eatables and Drinkables, was enquired into, it appeared that their Drink was chiefly Apple-Water, or Crab-Apples bruised and steeped in Water; and their Meat plain, simple, Country-Fare, with but little Flesh.

Now as their Drink was what we in ENGLAND call Beverage, that is, a Mixture of Water and Cyder: so the Place of their Habitation being on the Borders of POMERANIA (a † Country famed in History for Plenty of Fruit, and abounding perhaps with Apples too, from which it seems to derive its Name) these, probably, were a great Part, of that plain, simple, Country Food, by which our Author tells us they pro-

longed

† See Collier's Dictionary.

longed their Lives. Their Flesh Diet was very moderate; just enough (we may suppose) to cook up that ENGLISH Dish of a Squab Pie upon Occasion, and when, in entertaining their Friends, they indulged a little beyond the common and ordinary Way.

But I say no more upon this tender Point, lest I give Offence to the Professors in the Medicinal Art, and so draw upon me the Censure of an arrant Quack, by ascribing such wonderful Virtues to such contemptible Means.

I knew myself secure from the displeasure of my celebrated Æsculapius. * For as he was no less famed for his disinterested Spirit, and Publick Humanity, than for his great Skill in Physick; so in his various Researches into the Secrets of Nature, he would have been glad to have found all the Virtues of the Materia Medica contained in a single Apple, that he might have had the Pleasure of obliging the World with the valuable Secret.

And yet it is very evident, that if an effectual Remedy was found so near at Hand for the Cure of that single lingering Disease of the Consumption only, a great Part of the Physicians Business would cease. Yea, the Inventor of this Sovereign Elixir Salutis, though he might be rewarded by his Prince with a Patent, must yet expect to be pelted by the Fraternity in general, for exploding the large Trumpery of Physick; as St. PAUL was by the Crafts-Men, for banishing the Heathen Gods out of the World, and so bringing the Gain of their Craft or Occupation to nothing.

And now I am come to Scripture Testimony, it may suggest, perhaps, a Fancy to the Reader, that that Divine ought to be accounted Heterodox, and of a different Opinion from the Church, a Sceptick, or a Free-Thinker, who dares ascribe any sanative Virtue to a Fruit, the prohibited Use whereof some fondly conceive to have been the Introduction of Sicknes, Diseases, and even of Death itself into the World.

But surely the Apple ought to have the same fair Plea, and Indulgence, with a reputed Criminal at the Bar: I mean, not to be condemned by Hear-say, or Conjecture, till the Guilt is roundly and fully proved. In the mean while let the frequent and approved Use of Apples after * Dinner, (even at Tables most abounding with other Provisions, and as proper to help Digestion after a full Meal) serve to vouch for their Innocence at least, without retaining a Counsellor to plead it in Court *vivâ voce*.

I must

* ——— *ab Ovo*
Usque ad Mala.

HOR.

I must observe further that the Hurt did not seem to lie in the Paradisiacal Fruit itself, but in the Transgression of the Divine Command. The Prohibition might have been annexed by God to whatever Subject he thought fit. But on what Fruit soever it was fixed, the Fall of Man is not to be ascribed to any pernicious Quality in the Fruit itself; but to the Disobedience of a curious, unruly Appetite; edged on by Pride, and by the sly Insinuations of that cunning Serpent the Devil.

Not but that it hath been conjectured by some very learned Men that the Fruit of the Forbidden Tree was impregnated with some fermenting Juice, which (like that violent Operation too frequently perceivable in Cyder) put the Blood and Spirits of our first Parents into great disorder, and thereby divested them of the Power and Dominion which their Souls had before over their Bodies. That it clouded their Intellects, corrupted their Wills, and reduced every Faculty of their Minds to a shameful Deformity, to a miserable Depravity. Like that INDIAN Juice, which is said to turn even the most sagacious and sensible Man that drinks it into an Idiot, or natural Fool.

Supposing therefore that the Mischief did lie in the Fruit itself, I should be inclined, from those ill Properties of it, to conclude, that the Grape, and not my favourite Apple, was the very Fruit forbidden. For it was the Juice of the Grape which gave the first Occasion to Drunkenness, that we read of. By which the first Divine Orator, or Preacher of Righteousness, was befooled and cheated out of his Reason, and became exposed to his own Family: a Shame and Scandal to his Children, a Spectacle not to be endured without a Covering to hide his Deformity; a NOAH transformed, for a while, into the Condition of a Brute, and wallowed in the Mire and Filth of Sensuality.

With the bewitching Juice of the same Sort of Fruit, but rendered still more mischievous by the Art of the Distiller, unknown to the Ante-Diluvians, (which reduceth gross and large Bodies into a small Compass; as all the Evils, Diseases, and Calamities of Life were said to be crowded together in the little Box of PANDORA, which is a concise Representation of the woful Effects of the Fall of Man, according to the Heathen Theology) by their Brandy I say, our Neighbours of FRANCE, with their Serpentine Cunning, do draw us into the Snare. For this Liquor (which is extracted from their worst Wines, and even from Dregs) if not warily used becomes of the same intoxicating Nature with the LETHEAN Waters. It obliterates, for a while, all the Traces of Reason,
it

it destroys Men's Memories, makes them forgetful of what is past, and renders them unfit for present Service. It blunts the Edge of their Understanding, and enfeebles their Bodily, as well as Rational Powers.

Hence a late Physician of much Note in the Literary World, as he was in the Practice of his Profession, hath wittily called all Sorts of Liquors, in which Brandy makes a Part of the Composition, "The Devil muzzled."

But notwithstanding the Muzzle, the Cystis, or Bag of Poison, lieth concealed under the Tongue; and all the Liquors with which Brandy is wont to be mixed, cannot wash away its venomous Quality. The most that can be said in Favour of such compounded Liquors is, that those who drink Brandy in Mixture with other Ingredients of an innocent or less offensive Nature, may be said to do it with some Caution, though with some Imprudence. But those who drink it unmixed (*Puris Naturalibus*, according to the Tippler's Language) they really do it without either Fear or Wit; their Conduct is as bad as their Latin.

In the last War with FRANCE, when our Prisons were not large enough to contain the Prisoners, those of the FRENCH who had the Liberty to walk abroad upon their Parole, did sometimes, in cold, frosty Weather, call for a Dram of ENGLISH distilled Liquor at our Publick-Houses. But when instead thereof, a Dram of FRENCH Brandy was brought to them, I am credibly informed, that they only smelt the Liquor, but refused to taste it, saying, it was good for ENGLISHMEN but not for the FRENCH. So hospitable are they to furnish us, in a very plentiful Manner, with what they do not think it safe to drink, or even to taste, themselves! And why should not the ENGLISH be equally cautious of this combustible Liquor, who are not so well acquainted as the FRENCH are, with the Way and Manner of its Preparation?

To return from this long, but not altogether useless, and impertinent Digression.

The Management of Cyder is a Secret, which the Curious are too fond of keeping to themselves. As People have their different, and peculiar Ways of doing it, according to their several Fancies; and as they are notoriously ambitious of excelling one another in this Domestick Liquor, so, one would think, there was a Spice of Envy mixed with their Emulation, which hinders them from communicating their several Arts. They converse freely enough upon various Kinds of Husbandry, and upon the several Ways of ordering and managing their Lands, in such a Manner as to reap the most
advantageous

advantageous Returns from them. But, amidst their other Friendly Discourses and Communications, they are ever reserved and wary upon the Subject of Cyder. Here they sit as mute as the Gentlemen of the long Robe, who, when a Case of Property is stated to them in Company, and Questions are asked about it, do rarely open their Mouths without a Fee, till a chearful Glas hath relaxed their Tongues from their wonted and professed Taciturnity, and opened their Hearts to a generous Disclosure of their Thoughts.

Yea, even those who have obliged the World with Rules and Methods for Improvement of Lands, by the Plantation of Orchards, and from thence have passed on to Cyder; even these, I say, have handled this useful Subject but slightly, and *in Transitu*, as it stood in their Way to some other Article in View.

Some of them, it must be confess'd, have been nice enough in describing the several Engines for making of Cyder; but when it is made, they even leave it to the Mercy of Chance, whether it prove drinkable or not.

Others have, moreover, recommended a Separation of the good Cyder from the Lees, which, in the modern Dialect, we term Racking. But then they are so loose in their Reasons for, and Rules of doing it, that the Reader is still left to guess when, and how, it ought to be done. Hence it is that the Bee of Arts and Sciences, Mr. CHAMBERS, in his Universal Dictionary, hath said so little upon this Article. Although (like the painful Creature above) he hath ransacked Woods and Forests, Hills and Mountains, Sea and Land, and the Universe itself, for Honey to stock his Hive with: yet (for want of other Flowers, I suppose, to make a Collection from) he is obliged to take up with a single Quotation from Mr. WORLIDGE, and the Reader is still to seek for that Information which he expected.

Nor indeed can the Cyderist be, any other Way, perfect and compleat in his Art, than by narrowly attending to the whole Course of Fermentation. He must as nicely watch the several Periods of it, as a careful Physician notes the several Periods of an intermitting Fever, in a Patient whose Life he is anxious to preserve.

If any clear and distinct Treatises of Cyder have hitherto been published, they have escaped my Hands, and so fall not under the general Character above. For want of the Sight of any such, I conceived there might be Room in a wide World, for this little Manual, I have been the more exact and particular

cular in laying down the Rules, and in assigning the Reasons of them, for the Supply of the imaginary Defect above. In-
 somuch that I think I have rendered every thing clear, plain,
 and intelligible to the very meanest Capacity. For I have
 penn'd it for the Service of the Farmer *, as well as of the
 Gentleman *; for the Use of the poor Rack-holder, as well
 as for his rich and wealthy Lord. I have therefore endea-
 voured to put the Rules in such a Dress, and to express them
 in such Language, as to adapt them to the Taste and Com-
 prehension of every Reader.

* ——— *Lo thoughtful of your Gain,
 Not of my own, I all the live-long Day
 Consum'd in Meditation deep, recluse
 From Human Converse: nor, at shut of Eve
 Enjoy'd Repose: but oft at Midnight Lamp
 Ply'd my Brain. Racking Studies, if by Chance
 You I might counsel right. And oft this Care
 Disturb'd me slumb'ring. Will you then repine
 To labour for yourselves? and rather chuse
 To lie supinely, hoping Heav'n will bless
 Your Cyder thus neglected; or give Bread
 Unearn'd by Toil?*

PHILIPS.

But as Rules of all Kinds are jejune and dry, and a Sort of
 dead Letters, if there be not somewhat to quicken them; so
 I have intermixed Similitudes with them, and added a few
 Digressions to them, to divert the Reader, and to make them
 go down the better. Just as Apothecaries are wont to please
 and humour their Patients with gilded Pills. The Asa-Fœti-
 da thus concealed, is taken by the nicest Ladies without Re-
 luctance, though the Leaf-Gold is confessedly of no Manner
 of Use in Physick.

Some imperfect Draughts of this Essay have crept Abroad,
 and been well received, I hear, in many distant Parts of this
 Kingdom. For Strangers are always welcome, when they
 give the Masters of the House no Trouble, nor put them to
 any Expence in their Entertainment. But they are more
 especially so, when, besides the News they carry with them
 from their own Country, they offer to serve their Entertain-
 ers gratis; and without Meat, Drink, or Wages, to become
 Caterers for their Profit, as well as Pleasure.

If any of those few, whom I have obliged with the Rules
 for

for Improvement of their Cyder, do look upon Obligations of the same Kind to others, as an Infringement upon their Property, by thus breaking down the Enclosure, and turning the little Spot, as it were, into a Common; my Answer is, that I am very much mistaken, if I have ever yielded up the Possession into envious, mercenary, or selfish Hands. My Design in imparting it to a few, was, that it might be communicated to many, and so serve, in some Measure, the Ends of the Press; to which I had no Thoughts of committing it, had it not been suggested by a particular Friend, as a useful Article to be inserted in the Book of Husbandry. And I should be glad to hear, from my Readers in general, as I have already from those who have had the Manuscript Copies imparted to them, that they have as good Cyder of their own Growth, by a close Observance of these Rules, nay, much better than they can meet with at the publick Markets from the SOUTH-HAMS, or HEREFORD.

I am well aware that this Tract will appear in the Book of Husbandry, like a Stranger in a Publick Theatre. Some may cast a favourable Eye upon it, but others will look askint. There is one Class of Men in particular who will scarce forgive me, and from them I expect no Thanks. These are the Cyder Merchants, or such as make it their Trade to buy Cyder from the Pound, to manage and to sell it at LONDON, and other populous Places.

But when these Dealers consider, that although this Essay may prove of some Dis-service to their particular Employments, or Way of Business, (as it will teach every Farmer how to cure his own Cyder at Home, without being put to the needless Expence of sending it to the publick Cellars for that Purpose) yet if it will turn to the Publick Benefit, by improving a considerable Branch of the National Revenue, they will, surely, shake Hands with me. At the worst they cannot be so severe upon me, as not to pardon an Attempt which so directly aims at the Publick Good. Yea, perhaps, they may herein espy something (how unwilling soever they may be to acknowledge it) which had before escaped their Observation, or for which they could not render a proper and substantial Reason.

But whether they will acknowledge this or not, it is certainly the Interest of every Nation, to carry their Home Manufactures to the highest Perfection they are capable of, that so they may live as independent of their Neighbours as possible; and also export the superfluous Products of their own Country to Foreign Markets.

But

But alas! while instead of improving our Cyder, so as to render it fit for our own Tables, and saleable Abroad, our Heads are only projecting how to get Foreign Liquors to mix with it, and so to spoil, instead of improving it, in that costly Way; we are burthened and over-stocked with both, by a clandestine and destructive Trade with FRANCE, we part with our Money, and (which is still more valuable, on the Score of the many Hands employed in the Woollen Manufacture) sometimes with our Wool too; and so keep our Enemies warm against External Colds, for several Years; while in Exchange, they only warm us within for a few Minutes. We please ourselves with the Name of SAMSON (that is to say, Brandy and Cyder) but, like silly Prodigals, we wantonly part with the Golden Locks, in which our Strength doth lie.

I know it is a difficult Thing to stem the Tide of general Practice, and to persuade Men to any thing against their Inclination. It is like pressing upon them those hard Lessons in Religion of plucking out a right Eye, and cutting off a right Hand. It is a tearing up by the Root the darling Affections of their Heart.

To put an old Brandy Drinker, for Instance, under the Mortification of a total Abstinence, is like putting a Knife to his Throat, for he cannot live without it. He hath so overheated his Constitution with this combustible Liquor, that Cyder, alas! is become too cold for him. He fancies that he should be dead soon, if he hath not something to warm and comfort his Heart, especially in cold and frosty Weather, upon a Journey, after hard Labour, and to keep him warm while he is so; at least to prevent his cooling too fast, and to keep his Blood from being chill'd. Yea, Brandy is become an Antidote for all Intemperance, both in eating and drinking; just as one Sort of Poison is prescribed by the Physician for expelling another. Thus a Dram is exhibited by the Master of the Feast after a plentiful Dinner, or the Use of gross Food. It is the only Latin that we hear at Table for Pig and Goose in particular. It pinneth up the Basket, as we say, and becomes the last Glass at parting, after a Deluge of other Liquors. Yea, Tea, and Punch itself, are fancied not to sit quite easy upon the Stomach, without a clean Dram for a Rider. Thus Brandy hath the good Luck to obtain the Fame of a Sovereign Cordial, of a Catholicon that hits every Disorder, that is suited to all Constitutions, to all Times; to all Places, and to all Occasions.

I have

I have found many People in the World thus befooled to their Ruin, and have had an Account too of many more. But I am still sensible that the Corruption is not universal. I shall therefore think my Pains well bestowed, if they afford sufficient Caution to the uncorrupted Part of the present Generation, from falling into this fatal Snare, from whence their Friends or their Fore-Fathers did confess it even impossible for them to recover.

But I must not leave such poor miserable Creatures as I find them. If they are not already so blinded and besotted by this intoxicating Liquor, as to be entirely lost to their Reason, I must beg them to consider that, instead of supporting their Spirits by Brandy, every Dram is a Sort of fresh Wound, or Stab inflicted upon themselves; and that therefore every such repeated Act of Suicide, or Self-Murder, doth require also a particular Act of Repentance to wash away the Guilt thereof.

Nor must I look upon them as incurable, and so forsake them; as the Physician uncourteously turns his Back to his Patient, when he finds the cold Sweat upon him. For though the Disease of Brandy-drinking may be reckoned of the most inflammatory Kind, and highly malignant, yet while there is Life there is Hope; and a Cure may be wrought without running the Risque of a dangerous Experiment, or a desperate Remedy.

As those who have enervated and blunted their Reason, by this stupifying Liquor, are rather to be taken by Guile and Artifice, than to be wrought upon by rational Inducements, so I would recommend to them the pretty Device of a DUTCH Doctor, upon the like Occasion.

Finding his Patient too far gone in the Phrensy of drinking Brandy, to be cured of the ill Effects of it by Physick; that his Appetite to Food failed him; that his Pulse was quick and intermitting; that he had a Cough upon him; and that he had all the Symptoms of Night Sweats approaching, and so of his entering upon the last Stage of a Consumption; the Doctor thought it expedient to remove the Cause of the Disease, instead of dosing him with Physick; and so weaned him gradually from that fatal Practice by this artful Stratagem. He did not debar him from his favourite Cordial at once, but indulged him the Use of it upon this easy Condition; namely, that he should strictly observe to put a large Duck Shot into his usual Dram Glass, every Time before he took his Dose. For Lead, said the Doctor to him, is of a cooling, healing, balsamick Nature; and therefore good to refresh and strengthen

his weak and tender Lungs. By the frequent Addition of Shot, and their Continuance in the Glass with some of the Liquor, under Pretence of Infusion for an Hour, (according to the Doctor's Direction) the Dose was reduced at last to the Quantity of a Tea-spoonful; and by that Means he both reclaimed and recovered his Patient. For he grew well in Proportion to the gradual Diminution of his Dose. A very honest and cheap Prescription for the Cure of this wretched Malady of Dram-drinking. Not as other Sorts of Madness are cured, by Evacuations of all Kinds, by the tedious and painful Experiments of Cupping, Bleeding, Blistering, Vomiting, and Purging, and sometimes by the Correction of Chains too: but by the imperceptible, and daily Abatement of the wonted Superfluities of the Glass; and by a slight Curb, and easy Restraint upon an insatiable Appetite of Liquor. And thus the Vices of the Mind, as well as the Diseases of the Body, are best cured by Practices opposite to those that begot them.

The Usefulness of this Subject of Cyder must apologize for my having stepped out of my Profession to treat of. And if an IRISH Prelate hath condescended, for the Good of his Country, to enter into a Minute and Philosophical Examination of the Virtues of Tar-Water, and to extract a Panacea from the inspissated Juice of an Exotick Tree; why should a poor ENGLISH Vicar be deprived of the Pleasure, or be debarred the Liberty of casting his Mite into the Publick Treasury, by improving a Liquor of our own Growth, and of which we have such a vast Consumption among us?

The Rules laid down in the Beginning of this Essay I have fully experienced, in a Course of many Years Residence in the SOUTH-HAMS. When others have found as good Success in the Observance of them as I have met with, by rendering their Cyder from Fifteen Shillings a Hoghead, (the prime Cost at the Pound) worth Five Guineas; yea, as valuable as an Hoghead of Wine (each of which I have actually refused for a Hoghead of CORNISH Cyder) they will, at least think themselves so much obliged to me, as to say, that neither their Labour, nor my own, hath been ill-bestowed. I have received the thankful Acknowledgments of many, who have frankly declared, that their Cyder, which before used to be thin, poor, and hungry, hath, by their following these Directions, proved so rich, full, and good, that their Friends (especially those who have been bred in the Maritime Way) have, during the Summer Season, called for it at Table, and preferred it to the best of Port-Wine, and,

in

in plain Terms, they reckon it a valuable Article in House-keeping.

But I must be so sincere with my Reader, as to acquaint him, that those who have followed my Rules but in Part, and who have been diverted by a Multiplicity of Business, Company, Recreation, or Pleasure, from giving a due Attendance to their Cyder, they have found themselves much deceived in their Expectations, when it was too late to amend their Fault. Like heedless Practitioners in Physick, who dismiss their Patients with a single Phlebotomy, and Box of Pills, and take no farther Care about them, till their whole Mass of Blood is corrupted, and their Constitutions are quite emaciated. But although, in chusing an As for their next Doctor, the Patients may happen to be restored, by the Balsamick Milk of that, otherwise contemptible, Creature, to a tolerable Share of Health; yet the Cyder is gone (as we say) past Recovery, and beyond the Art of Man to cure.

But as this Dissertation is intended for the Benefit of my Country in general, and more especially for the Use and Service of those Parts of the Kingdom which do most abound with Cyder, so it would sorely grieve me to hear that an ill Use is made of it. It would much trouble me, I say, if some leading Member of Parliament, who is not a Representative for a Borough in DEVON, HEREFORD, or CORNWALL, should, in the Vacancy of State-Affairs, have the Curiosity as well as Leisure, to cast his sagacious Eye upon it, and so, in Envy to the singular Happiness of the few Counties famed for Cyder, should be tempted to move for an additional Duty upon it, in some future Session. For, if repeated Struggles have been made in the House of Commons, about taxing the Juice of the Apple as a Potable only; to what Height may the Debates rise, when a second Sir R—RT shall appear there, and, with all the Flow, Grace, Dignity, and Force of Senatorial Eloquence, shall move and suggest, that Apples do not only supply us with Meat and Drink, but that they serve us also for Physick as well as Food.

For that the Apple affords a healthful Nourishment, is evident not only from the Foreign Examples of the POMERANIANS, cited above out of Dr. BAYNARD; but also from Instances near at Hand, of the Inhabitants of the SOUTH-HAMS (where the Seeds of this imperfect Essay did at first appear) and of the County of HEREFORD (which was the Scene of Mr. PHILIPS's Poem on the same Subject.) For as Apples, cooked up in various Forms, are a considerable Part of their Food from the End of JULY to the Beginning

of DECEMBER, so Cyder is their principal and constant Liquor throughout the Year. And yet a more healthy Body of Men, or more * chearful in their Way, and truly merry in their Compotations, cannot be found throughout the Kingdom.

* *The Farmer's Friends, at thirsty Hour of Dusk*
 Come uninvited: he, with bounteous Hand,
 Imparts his smoaking Vintage, sweet Reward
 Of his own Industry. The Nut-brown Fugg
 Circles incessant, whilst the bumble Cell
 With quiv'ring Laughs, and rural Jest's resounds.
 Ease, and Content, and undissembled Love
 Shine in each Face: the Thoughts of Labour past
 Encrease their Joy. —————

Gladsome they quaff, yet not exceed the Bounds
 Of bealthful Temperance, nor steal from Night,
 Season of Rest: but well bedew'd repair
 Each to his House with unsupplanted Feet.
 Ere Heaven's emblazon'd by the Rosie Morn,
 Domestick Cares awake them. Brisk they rise
 Refresh'd, and lively with the Joys that flow
 From amicable Talk, and moderate Cups
 Thus sweetly interchang'd. No noisy Brawls
 Arise from social Glasse. May BRITONS all,
 Remote from brazen Sound of War, enjoy
 Nectarous Cyder, and with seemly Draughts,
 Enkindle Mirth, and hospitable Love.

————— But let them thank
 That Providence which annually supplies
 Their Cellars, and with her rare liquid Gifts
 Exhilarates their languid Minds, within
 The golden Mean confined: beyond there's nought
 Of Health or Pleasure found. But when thy Heart
 Dilates with fervent Joys, and eager Soul
 Prompts to pursue the sparkling Glasse, be sure
 'Tis Time to shun it. If thou wilt prolong
 Dire Compotation, forthwith Reason yields
 Her Empire to Confusion, and Mis Rule,
 And vain Debates. Then twenty Tongues at once
 Conspire in senseless Jargon: nought is heard
 But Din, and various Clamour, and mad Rant:
 Distrust and Jealousy to these succeed,
 And Anger kindling Taunt; the certain Bane

*Of well-knit Friendship. Now horrid Frays
Commence: the Bumper-Glasses now are burl'd
With dire Intent: Bottles with Bottles clash
In rude Encounter: round their Temples fly
The sharp-edg'd Fragments: down their batter'd Cheeks
Mix'd Gore and Cyder flow. Ye Heav'nly Powers
From BRITISH Isles such dire Events remove
Far distant; neither let our civil Broils
Ferment from social Cups! May we enjoy
Our humid Products, and with temp'rate Draught
Enkindle Mirth and hospitable Love!*

PHILIPS.

But it must also be noted, that when they happen to take a cheerful Cup, they commonly know their *Quantum Sufficit*, wind up their Bottoms, and either return to their Labour, or to their Rest. Thus they enjoy an almost uninterrupted Health; feed (as we say) like Farmers, and avoid those Excesses by which the intemperate Part of Mankind are led into many Inconveniencies; to the Ruin of themselves, of their Fortunes, and of their Families.

If any should here observe, that I have overshot my Mark, and that Cyder, Sobriety, and Temperance are very distant Subjects, I have this to plead, that in directing People how to make their Cyder, better I should have done them more Hurt than Good, unless a seasonable Caution had been interposed and interwoven, if I may speak in the Phrase of a Woollen Manufacturer, with the several Threads of this Essay, to make the Drinkers of this Liquor to become better also. To render their Cyder more palatable, would be only laying a more subtil Snare to entrap them, unless I had also pressed and recommended a temperate Use of it.

The ENGLISH are, by their very Enemies, acknowledged to be a brave and a warlike People. Even the King of FRANCE (if Credit may be given to the Publick Papers) allows them to have Hearts, though he is pleas'd to deny them Heads. And it must be confess'd indeed, that ENGLISH Heads are mightily injured, but not totally destroyed, by FRENCH Brandy. His Majesty therefore may be said to deal by us as the PHILISTINES did by SAMSON; first to blind us by his intoxicating Spirits, and then to jest upon, and make Sport with us. But when we recover from this Lethargick Fit, as SAMSON's Hair grew again, and his Strength with it, the Pillars of absolute Monarchy may possibly shake, as those of the Temple of DAGON were removed by the

Hands of the Giant; avenging himself at once upon the PHILISTINES, for their unseasonable Mirth, and for the Loss of his two Eyes.

I do not speak this to exasperate our Military Men, but to imprint in their Minds this seasonable and certain Truth; that if they were as sober as they are naturally brave, they would excel in every Station of Life. They would shine both in a Council of War, and in the Field of Action. Their Enemies would no more come near them in the Stratagems, than they are able to withstand them in the Exploits of War.

That excellent Rule, he that striveth for Mastery is temperate in all Things, is as needful to be observed in the Carnal, as in the Spiritual Warfare. A sober Warrior keeps his Reason cool, awake, and considerate. He hath the free Use of all the Powers and Faculties both of Mind and Body. His Head is as quick to distinguish and contrive, as his Eye to espy, and his Hand to execute. He soon discerns the most weak, open, and unguarded Parts of his Enemy's Troops, or the least Defects in their Fortifications: and as boldly pusheth his Way thro' their Ranks, forceth their Lines, or mounteth a Breach. By the Rules of Temperance (the Sister of Fortitude and Prudence) thus steering his Course, as the Sun doth by the Zodiack, like that glorious Luminary he is bright in all his Faculties, indefatigable in the Charge assigned him, and rejoiceth as a Giant to run his Course. In this active, yet unwearied Manner, methought I beheld with grateful Eyes, in the last War, our BRITISH Hero traversing Sea and Land; and no sooner leaving FLANDERS, than appearing in the memorable Field of * CULLODEN, and charging the insulting Rebels with such undaunted Bravery (in Defiance of their once formidable Back-Swords) as to put them to a perpetual Flight, we hope, as well as Shame.

* ————— Here might you see
 Lairds, and their Clans on the embattled Field
 Slain, or half dead, in one huge ghastly Heap
 Promiscuously amast: with dismal Groans,
 Ejaculations in the Pangs of Death!
 Some call for Aid neglected: some o'erturn'd
 In the fierce Shock, lie gasping and expire,
 Trampled by fiery Coursers. Horror thus,
 And wild Uproars, and Desolation reign'd
 Unrespited. The young Adventurer

With

*With long-stretch'd hasty Strides forsakes his Host,
Trembling, agast, not venturing to look back,
Posting for FRANCE: but leaves the envy'd Crown behind,
His Title and Descent best prov'd by Flight:*

Witness, thou BOYNE: and witness, CULLODEN —

*May GEORGE's Crown long flourish on his Head
In spite of FRANCE and ROME! May CUMBERLAND
Continue long to guard his Father's Throne!*

On the contrary, if we take a View of Sottishness, we shall find it the Parent of those twin Sisters, Folly and Cowardice. The Person addicted to it cannot have his Senses nor his Intellectuals clear. His Head is filled with gross Fumes, and his Understanding clouded. A Mist continually obscures and veils his Reason. The Virtues of his Soul are lulled asleep, and he is hush'd and becalm'd into Ruin. His bodily, as well as rational Faculties are brought into Bondage, and laid in Chains of Iron. He becomes weak and enervated in both, and the Soldier in this Condition, like a Drum without Braces, is unfit for the Battle.

Should I here pass over the BRITISH Sailors, they would rage and storm upon me, as not thinking them worth my Notice, though I really esteem them as a very valuable and a very useful Body of Men; and the more I know them, the greater Reason I find to respect them. Among Friends Freedom of Speech is allowable, and the honest Tars cannot blame me for wishing, that they were to be reclaimed by reflexions of this Nature. But alas! they are such a merry, thoughtless, jovial Crew, that they are only to be cured by Time and by dear-bought Experience. They are such an active, and yet such an idle Sort of Men, so averse to Fatigue and Labour, and yet so fond of running into the most busy Scenes of Life, so profuse of Money, and yet so often hazarding their Lives for it, so fam'd, in short, for the Extremes of Activity and Indolence, of the eager Thirst after, and the visible Contempt of Gain, that they seem a perfect Riddle, and to surpass all Description.

But amidst such various Contrasts as centre in their single Character, the Courage of ENGLISH Sailors doth either atone for all their Failings, in the Eye of their Fellow-Subjects, or casteth a favourable Covering over them. Their Valour is not to be paralleled among the Maritime Tribe, and no more admits of Contradiction than it will submit to Opposition. I can compare them to nothing better than to ENGLISH

Cocks, which, though they exceed all others upon the Pit can yet contentedly riot upon a dung-Hill.

But, to their Honour be it spoken, considering the many Hardships and Difficulties which they had to contend with in the last War, they sometimes even out-did themselves, and performed Wonders. Though, like the finny Tribe, they derive their Livelihood from the floating, turbulent, unsteady Element, and their Bread is cast upon the Waters, yet they have been often obliged to pull it out of the Fire too. As if they could not enough distinguish their Bravery without courting Danger, they have often engaged betwixt a double or treble Fire of the Enemy's Cannon; that so, like that very Gold which they at once covet and despise, they might by such a Purification, appear with the greater Lustre. Yea, when they have been over-powered by a much superior Force, they have disdained to strike to FRENCH Colours, but in the last Extremity, when their wooden Castles became so leaky, that the Deep was ready to swallow them up. But, amidst all their brave Engagements, and their many signal Feats at Sea, it is reasonable still to suppose that they would have performed more, had the common Sailors been as sober and temperate as many of the Commanders and inferior Officers, under whom they fought.

But among all the valiant Exploits at Sea, I should be wanting, in Respect to my quondam Parishioner Captain PHILIPS, did I omit to mention his gallant Resolution in cutting an ENGLISH Man of War out of a FRENCH Harbour. An Action not unlike that of JASON, so much celebrated in antient History: the bringing back the SOLEBAY, together with two Hundred and fifteen FRENCH Prisoners in it, from the Road of St. MARTIN's, being, in all Human Appearance, as impracticable as the fetching the Golden Fleece from COLCHOS.

As this Action stands singular in the ENGLISH Annals, so the BRITISH Argonaut's Misfortune was singular likewise. For his not being bred in the Navy excluded him by the Rules thereof, from the just Reward of his Merit. His Majesty, however, was graciously pleased to distinguish him, and to bind him, as it were, by the strongest and most significant Tie of his Royal Bounty: namely, by a Gold Medal affixed to, and pendent on a treble Gold Chain. But the Command of his own Prize was what he had at Heart; as it would have afforded him more Room for the Display of that Bravery, which, for want of a stouter Ship, he afterwards

afterwards signalized upon the INDIAN Coast in a diminutive Packet-Boat.

Having thus paid my Acknowledgments to the ENGLISH Soldiers and Sailors, it would be but a low Compliment passed upon them to say, FRENCH Brandy is not good enough for them. Could I render ENGLISH Cyder like the famed Nectar and Ambrosia of the Heathen Gods; or the more modern, but no less fictitious Liquors of *Aurum Potabile*, to make them immortal, and so to cause their Lives to be as durable as their Fame, I should not think it above their Desert. But as they would still covet a Sip of the right Nants, or Coniack, so, if a Cordial Whet is to be indulged to any who are not under an actual Deliquium, those surely have the best Title to it who fight our Battles, and who, upon a Push, may require just as much as will suffice to blunt the sharp Sense of Danger, to quicken their Spirits, and to push them on to Action.

But let them ever remember, that true Fortitude cannot be instilled from the Alembick. It flows from a much nobler Fountain; namely, from the steady and immutable Principles of Religion, which arms its true Professors with Courage in all Extremities. It will not permit them tamely to yield unto, or sneakingly to draw back in the most threatening Dangers, where the Rights and Interest of their King and Country do demand their Assistance. For “Christian Heroes (to use the Words of a late * Military Person upon the same Subject) will expire in Heaps before his Pavilion, to guard the important Life of their Sovereign; and, in the joint Cause of Heaven and Earth; of our Religion and Liberties, destroy like ministring Angels, or die an Army of Martyrs.”

When the Reader considers that we are just upon the Brink of a bloody War, he will pardon a Digression, which is meant to whet the Courage, and to fix the Resolutions of those, who are like to be concerned in the most busy Scenes of it. And howsoever the ENGLISH may be represented by a neighbouring Power (like POLYPHEMUS in LUCIAN) strong, but blind; yet we trust that (through the Goodness of that Providence which hath ever befriended us) we shall be supplied with the Eyes of ARGUS, to watch and direct the State, as well as with the Hands of BRIAREUS to fight our Battles.

A Change of Topicks in Writing, as well as of Business in Husbandry, serves for Amusement. If these Political Re-

marks

* *Mr. Steele's Christian Hero.*

marks do not afford the Reader that Sort of Entertainment, which the Title Page gave him Reason to expect throughout the whole Essay, I must frankly confess that the Subject is of such a barren Nature, and lies so much out of the common Way of Writing, that, like the Apple itself, it will not afford any Juice without squeezing. I have therefore been sometimes at a Loss even for Words to cloath and convey my Sentiments in, so as to render them intelligible. For Cyder, though a liquid Substance, is yet a very dry Subject to write upon. Hence it came to pass, that in his celebrated Poem upon it, Mr. Philips, though a Writer of a very lively Fancy, found himself obliged to make many Excursions into Similitudes, Personal Characters, and other Amplifications, quite foreign to his Favourite Nectarian Juice. Some of his Observations I have referred to; and they are set down without mentioning the particular Page. Since the Review of the first Manuscript Copies, many fresh Hints have started up, which are inserted here. They could not, without some Reluctance, be either prevented or suppressed, the Conceptions of the Mind being like those of the Body, and, when once formed into a Fœtus, the Burden encreases daily.

Several worthy Gentlemen have desired to see these Cyder Directions printed for the common Good, and have offered a handsome Encouragement for their Publication by Subscription. But when I made a Motion to one or two of them, for their Patronage of them, they modestly refused to have their Names prefixed to an Art, which they did not pretend to have the Skill to protect, because they did not understand the Art itself.

The Vessel is therefore launched, without a Pilot, into a wide Ocean of Contradictions; into a World of Yeas and Nays; of Commendation and Blame; of good Report and evil Report; of Praise and Calumny. As it is thus committed to the Rage of Wind and Storm, it only remains that I wish it a prosperous Voyage, for the Benefit of Posterity; and so I bid it Adieu.

BOOK

B O O K V.

Of the Accidents to which the Cattle and the Crops are liable.

The INTRODUCTION.

AS it has been our Custom in the preceding Parts of this Work, not only to inform the Husbandman of such Things as it is necessary for him to know; but to explain them as minutely and exactly as we are able, that by being familiar to his Understanding, they might be imprinted in the more lasting Manner on his Memory; we shall endeavour to prosecute the same Method here, though in this Case more difficult than any other. There is the more Reason for attempting it, because such a Knowledge is in no other Article so necessary. The Accidents we are about to treat of are of the most important Kind; and if the Causes of them be not properly understood, they never can be prevented. For this Reason, we shall in the first Chapters of this Book examine into, and so far as that can be done, explain to the Husbandman the Nature of such Incidents, in the Air and Elements, which are the Occasions of many of them; that by understanding in what Manner the Hurt is done, he may know what are the Means in his Power, if there be any, to prevent or guard against it.

Under this Division we shall also consider the Meteors, as the Learned call them, Rain, Hail, Snow, and the Rest; and instruct our Husbandman how far he may be able to foresee them, and consequently be prepared to guard his Flock and his Crops against the Danger they naturally would receive from them.

After we have thus enquired into the Causes, we shall trace the Effects in those Disorders they occasion in the several Parts of the Husbandman's Concern; and thus endeavour, under this most important Head, to lay down in a few plain Words a System of *Rural Philosophy*; which if not enough to satisfy the utmost Curiosity of idle Minds, shall yet offer every Assistance that has been discovered to serve the practical Farmer.

CHAP. I. *Of Heat considered in itself, and its Effects on the Stock and Crop.*

THOUGH Heat be the very Principle of Life in the Universe, yet it may be attended with fatal Consequences

quences to every Thing in Nature. The Degree determines the Utility of every Thing; and in the present Case, that which when moderate is the Support and Preservation of all Things, when excessive is their Destruction.

We are not here to enter into the Effects of Heat in the Condition of actual Fire, which dissolves, dissipates, or destroys all known Substances; but that Degree of it only, which may be in the Temperature of the Air. The Farmer will not bring Metals to the Furnace, nor expose Gold or Diamonds to the Power of great Burning-Glasses, which in their full Force scatter the one, and split the other to Shivers: these are the Amusements of Philosophy; we are concerned only with its Use. We shall confine ourselves to the Nature and Effects of that Degree of Heat which is at times felt in the Air, and to its Influence upon the Cattle and Produce of the Ground: and as we limit this Work to the Service of the Farmer, we shall advance nothing but what stands on certain Proof, and what his Reason will find it easy to comprehend.

Our Island is subject in the Summer Months to very considerable Heat, when Accidents conspire to continue it unalayed. Nature has so well adapted the Creatures of the Island to this, that they are none of them destroyed by it; nor the smallest Plant, unless irregularly exposed to it: but its Effects are very hurtful, though not so great as utterly to kill them. We see Cattle fainting and losing their Flesh, and Plants fading and drooping, according to the Degree of the Heat; and this the Farmer is with his Care to prevent, by Shade and Shelter for the one, and by watering the other when needful.

Many Plants, and most Animals, bear the Effect of Cold better than that of Heat, for this plain Reason, that the Cold only condenses their Juices, whereas the Heat dissipates them.

The Effects of this Temperature of the Air are more sensible on Plants than Animals; wherefore we shall principally consider them in that Light.

Many Plants will grow in a very considerable Degree of Cold: but when it comes to freezing, tho' a Multitude endure it and keep alive, yet few have the Vigour to shoot. The slightest Frost stops the Growth of most Plants, and a Degree somewhat stronger it stops that of all.

This is a Principle perfectly established by Experience, and the Farmer will learn from it what he is to expect with Regard to his Winter Crop.

Young Plants suffer more by Frost than those somewhat advanced in Growth; therefore let him provide for such as are to stand the Winter accordingly, and expect from them Nothing

thing but what Nature will support. Let him sow them in such Time in Autumn, that they may have some Strength before the Coming in of Frosts; and let him expect little more from them during Winter, than to establish themselves well in the Ground. In the Days of Frost he sees they can only support themselves alive, for to grow in that Time is against the Course of Nature; therefore what little Shoots they can make must only be during the open Weather; and these will be so checked by the Return of the Frosts, that there cannot be any great Progress.

As Nature has provided for the supporting the Generality of Plants alive during the coldest Weather we have in this Island, we are to be under no farther Concern on that Head; but to examine the various Degrees of Warmth and Heat; rising from this, to the Extream of what our Seasons afford.

The Warmth of the softer Winter Months brings Plants a little forward; the gentle Heat of the Spring makes them shoot apace; the greater Heat of Summer ripens their Flowers and Seeds; and even the greatest, as we have shewn, is not enough to destroy them, unless the Negligence of the Husbandman join with it.

A gentle Warmth puts the Sap of Plants in Motion; and the greatest Power of it within Moderation, unites and cements their best Juices for the Formation of their most useful Products: but when we come to a Degree any thing considerably greater than this, it operates in a Way directly contrary to what we have named, separating and dispersing their best Particles, instead of bringing and uniting them together. It is therefore a Plant pushes out its Flowers, and ripens its Fruit or Seed in this moderate Degree of Heat; but in the Extream fades and decays.

Many a Crop that might have produced very well is lost, or comes to little, for Want of the Farmer's proper Assistance. Different Soils and different Situations make Plants bear Heat differently, some better, others worse; as also their several Kinds. We have told the Husbandman what Species suit what Soils and Exposures best, having always kept this Article of Heat in Mind; and with proper Regulation there is scarce any such Thing as a Crop's utterly failing this Account. When we consider how much hotter some Countries are than ours, this will appear less strange; for there are Plants which live in the hottest of them.

Experiment shews what would scarce else be credible; respecting this Article, Dr. HALES, whose Veracity or Accuracy never have been or will be questioned, asserts, that Plants will endure

endure without Prejudice a greater Degree of Heat, than that of Water, made as hot as that a Person can but just endure to hold his Hand in it without stirring it about. He has therefore fixed upon a larger Degree of Heat than this, for the utmost which Plants will bear, and ascertains it at that Heat of Water upon which melted Bees-Wax begins to harden.

This is an Experiment very happily chosen, since Bees-Wax being a vegetable Juice, tho' collected by the Bee, such a Degree of Heat as would absolutely dissolve that, must be the utmost Point Plants can bear.

This explains to the Farmer how much his own Neglect is to be blamed at many Times, when he gives up his Crop as spoiled by Heat: this is a Degree of it to which Plants never will be naturally exposed with us: therefore he may for his Satisfaction establish this Maxim; that if he conduct himself properly in all the Articles we have named, in the sowing and Management of any Crop, it will never be lost by Means of the Heat.

If a Weather-Glass of the common Make be divided into a hundred Parts from the Degree of Cold at freezing, to this Degree of Heat determined by the melted Wax, it will give all the Degrees of Heat to which Plants will ever have any Reference. Few Houses are without a Weather-Glass, and the Farmers never should. The Kind made for this Purpose is that called a Thermometer, and the Husbandman will do well to have one with this Division, which will come as cheap as any other. This will shew him at all Times what is the Degree of Heat in the Air, much better than what he feels at random by his Body; and according to this he will know in what Degree of Health, or in what Danger his Crop is from this Article.

In a Space thus divided, sixty-four Degrees is about the Heat of the Blood in Animals. Experiments have shewn, that the Heat of the external Part of the Body is that of about fifty-four of these Degrees: the Heat of Milk as it comes from the Cow is fifty-five Degrees; which Degree is about the same that serves for the hatching of Eggs; and that of new made Urine is about fifty-eight.

These Degrees of Heat being known, with Respect to the Parts and Bodies of Animals in Health, they give us a Mark by which to know their Sicknes; and the Comparison of what Degree of Heat our Summers commonly afford, with what Plants will bear, which is perfectly known by this Method, will farther confirm to the Farmer what we have asserted already, that when his Crops fail, as is supposed by Heat, it is

not

not by the absolute Effect of that, but by his Mismanagement joined with it.

The common Degree of temperate Weather in this Division is about eighteen Degrees; and the great Heats of Summer will raise it to eighty eight Degrees. This is a vast Advance; it is four and twenty Degrees hotter than the Blood of Animals naturally should be: but even this, though without Care it will make Cattle faint, and expose them to Disorders, yet is no less than twelve Degrees below the extreme Heat that Plants will bear without Prejudice, if they be properly managed.

There are Countries in which the Plants all endure this Degree of Heat many Months, for several Hours each Day, and more; but what is seen in them verifies what we have told the Husbandman. They hang their Leaves and fade, and would be killed by it, but that they are supported and refreshed by the great Dews of the Evenings and Nights in those Places.

Nature has for this Reason made many of the Plants of those hot Regions of such a Form, that they have no Leaves; these being the Parts that suffer most readily by the Violence of Heat.

Though we have named the Height of eighty-eight Degrees, as what the Weather sometimes arrives at in our Summer, the Farmer is not to imagine that every Summer is so hot; much less that every Plant must of Necessity be exposed to such a Degree.

The common Heat of a Summer Day in the hotter Months, and in the Middle of the Day, is about fifty Degrees of this Measure. There is a great deal of Difference between this and the Heat marked at eighty-eight, which yet is twelve within what Plants may bear. But yet this is a Degree of Heat to which his Cattle are not exposed, tho' a great many Parts of his Crop are. At those Times when the Heat is at fifty Degrees in the Sun, which is to be called a Summer Noon-tide Heat, it is but thirty-eight Degrees in the Shade. The Farmer should carefully observe this Article, that he may see what a vast deal is in his Choice by a proper Management. 'Tis true that the great Heats of Summer subject his Cattle to many Disorders, as we shall presently see at large; but he sees here, that it is in his Power to moderate that Heat twelve Degrees in fifty, by a proper Shade.

Motion encreases Heat to a very great Degree, therefore let him take care, that when the Days are hottest, his Cattle are kept the most quiet. In the same Manner, as the Middle of the Day is the hottest Part of it, let them be kept particularly

cularly quiet during that Time. These are Rules founded on plain Reason and daily Experience, yet though plain and obvious they are not sufficiently regarded. The Husbandman may, by an irregular Proceeding, heat his Cattle as much in MAY, as the Nature of the Season would do in JULY: and on the other Hand, by proper Hours of Rest, and due Shelter, he may in the Effect reduce the most extreme sultry Weather to the Condition of temperate.

With Respect of Plants, an observation of the Degree of Heat, and of their general Condition and Progress, will shew abundantly the Truth of what was before asserted, respecting the Effect of a moderate Heat for promoting their Growth, and the Effect of a greater Degree of it in ripening their Seeds. At a Medium, the Heat is in APRIL at about fifteen Degrees. This with the Assistance of the Rains at that Season sets the Plants to shooting. In MAY and the Beginning of JUNE it advances from that to twenty, twenty-five and thirty Degrees; and in this Time they grow most, and strengthen themselves best. After this come the more extreme Heats, and the Seed ripens. In general, the Degrees of Heat between twenty and thirty, are those most suited to the Growth of Plants. If we may be allowed to give a Sort of general Calculation for the Rest of the Year, we may say that the common Heat of the Beginning of Spring, and the Decline of Autumn, may be reckoned between ten Degrees and eighteen; and the Winter Heat within ten Degrees of the freezing Point.

CHAP. II. *Of Drought, its Nature and Effects.*

WHEN the Summer Months beside being extremely hot are also extremely dry, the Farmer's Crop never fails to suffer greatly, unless well assisted by Art. In the hottest Countries there are the largest Dews; and in the same Manner, in our hottest Seasons the greatest Quantity of Moisture is exhal'd from the Earth, and serves to refresh the Herbs again in its Fall; but it is not enough to preserve them in Vigour. Nature intended for them the Assistance of Rains, and when these are with-held, the Husbandman must supply the Defect by his Industry.

The Products of open Field Land are most exposed to the Damage that is sustained from Drought, and Corn more than Pasturage; yet none are exempt. In Seasons but slightly droughty the open Field Corn suffers, and the Farmer reaps but

but a poor Harvest: and in the Extream of this unfavourable Weather there is little Grass for the Cattle.

The Stock thus suffers by Means of the Scarcity of Food; and commonly there is great Want of Water for them at the same Time. These, added to the natural Disorder of their Bodies from the Heat itself, are Sources of many Disorders; so that it is a very important Concern to the Farmer to make the best Provision against the Damage that he can, and to do all he can to remedy it when it happens.

The Method of preventing the Effects of Drought is pointed out by Nature: indeed the Husbandman's whole Practice is so, if he would but follow her Steps. Let him ride about the Country in the Extrems of a drougthy Season, and observe the Effects of it on Lands that lie differently. We have observed that it is in open Fields the Effect is worst; and in the others he will see the Damage less as the Enclosure is better. This may shew him that the proper Guard against the Accident of Drought, is by keeping up his Fences, and planting them well with Trees. We have spoke of this before, and recommended it very warmly upon the Consideration of its Advantage in Respect of Wood: here is another and a very great one. The Effect of the warm Sun upon Plants of the same Kind in open Ground, is ten Times greater to do them Harm, than in such a one as is well enclosed: we have shewn its Heat is greater, but that is not all; Drougthy Seasons are always attended with burning Winds: these parch up the Plants which the Heat only faded; and against these three joint Causes of Mischief no common Plants can well stand. 1. The Heat dissipates and evaporates a great Quantity of the Juices. 2. There is no Recruit from Showers for a Continuance of Time, and the Evaporation is all the while daily repeated; And, 3dly, The dry Winds follow, to shrivel up what the Sun had faded. These are natural Consequences; the Leaves wither and droop, no Moisture comes to refresh them, and Winds parch them up: they must fall off. We have, in a preceding Part of this Work, shewn what are the Nature and Uses of Leaves on Plants; and it is plain the Loss of them must be very destructive to the Whole.

We have laid down the Cause of the Mischief Plants receive from Drought, to shew the Farmer the Propriety and Necessity of what we are proposing by Way of Remedy. The Heat and Drought do their Damage but partially and ineffectually, unless the Winds come in to their Assistance. A Plant may droop and hang its Leaves from Day to Day for a considerable Time, and yet upon a small Shower it will

recover: but when a parching Wind blows over it upon the Heat, in that drooping Condition the Leaves fall, and then no Rain recovers it to any Purpose.

Now the Exposure to these drying Winds appears to be the Thing that compleats the Destruction of the Plants; therefore the Farmer's Business is to guard against that. The Elements will not obey his Pleasure, but he may defend his Crop from this Mischief of Winds. The Sun will dart its Rays in Spite of all his Caution; and there is no Art by which he can make the Clouds drop their Treasures of Water: to these therefore he must submit; but the Mischief of these is but partial and ineffectual without the Winds that follow: and tho' he cannot prevent these, he can guard his Crop against them. To this Purpose let him thicken his Hedges at the Bottom, and plant Trees in Abundance, that will grow to a Height, and almost meet by their Branches all the Way up. This will be a Defence not only against the Winds, but in some Measure against the Sun. The Thickness at the lower Part will perfectly well break the Force of the former, and the large Shade over the Field for a great Part of the Day by one or other of the Hedges, will defend the Growth against the latter. The Plants thus sheltered will enjoy a State of the Air many Degrees cooler, than if the Sun had its full Effect upon them: and there is another Advantage too little considered, which is, that the Number of Trees will by the great Quantity of watery Matter they perspire, render the Air less scorching.

The Profit of Wood will also recommend this Method of Shelter, for it is very considerable: on all Accounts we advise the Farmer to fall into the Practice, but still within the Guidance of Moderation; tho' we advise him to thicken all his Hedges about those Places, where, from the Situation, Drought is like to be most destructive; yet we mean this should be done in a prudent Manner. The larger the Field the loftier should be the Trees. For common small Enclosures a well grown white Thorn Hedge, managed as we have directed, is a sufficient Defence: in those of a larger Extent the Pollard Hedge, will be the most proper; and for the largest, tall Elms, and other Trees of the like Kind, which are to be indulged in spreading out their Side Branches, provided they do not over-hang the Ground too much, or starve the Head.

For this Purpose we shall advise the Farmer, in some Degree to imitate the Practice of the Gardener in his cutting of those

those Trees, which he means should grow fan Fashion. Let him cut off the Boughs of these Elms and other Trees that grow toward one or the other Field, and encourage such as run parallel with the Course of the Hedge. This will have a great Advantage: the Side Boughs will thicken, and will be a better Shelter and Defence, and the Growth will at the same Time suffer nothing from their Over-shadowing or Drippings. There must be always a fine leading Shoot left for the Top, to carry up each Tree in Height, while it is thus spreading Breadthwise; and with all the Advantage there will be a great deal of Beauty. This is a Thing not to be considered by the Husbandman, at the Expence of Convenience, but when it falls in with that, 'tis certainly worth Regard. The judicious Eye abhors the Gardeners Practice of clipping up Trees in this Manner in strait Lines, Leaves and all, till they resemble a Wall, because it is stiff, formal, and out of Nature: but what we advise the Farmer to do, which is no more than cutting away such large Boughs as stand strait forward, will have a most pleasing Effect. There will arise from it a Flatness and Breadth sufficient to please the Eye, though not so formal as to offend it; and the remaining Branches will give the whole an Air of perfect Nature: such Trees will look only as if they had chanc'd to have grown very prettily. Every Field will thus have the Aspect of a Garden, only more natural and more beautiful.

C H A P. III. *Of the Care of the Fields in the Management of Shelter.*

THE Husbandman will see that we have thus contrived for him an easy, and a very effectual Remedy against the principal Danger rising from Drought; but he will naturally observe, that these Hedges must be cut, and these Trees lopp'd at Times; and it will be natural to ask, what is then to be the Defence of the Crop? The Answer is not difficult, nor is this any great Inconvenience. The Improvements introduced of late Years into Husbandry, give the Farmer a great Advantage in the Variety of Crops; and he will find that Change in no Respect more serviceable than the present.

There are Plants which will endure Drought much better than others; and these he must contrive to have upon his Lands at the Time when he is to cut his Fences. This will not be difficult, because the cutting these is always in his own Choice; he may not only do it when he pleases, but he

may know a Year or two before hand, and provide accordingly.

The general Rule is, that the deeper Plants root the better they resist Drought; and the Reason is very obvious, because Drought affects Herbs only in Proportion to their want of Resources against it, and these Resources are always greater the deeper they are sough. A little dry Weather will parch the Earth about a slight rooted Crop; but it must be a long Continuance indeed that can affect it to the Depth some of the new introduced Plants reach.

We have explained this Matter of the deep and shallow rooting of Plants in a preceding Part of this Work, therefore shall not repeat it here; but shall give the Husbandman this general and universal Caution, that he proportion the Growth to the Condition of the Shelter. He will always know at what Time it will be bare, at what Time it will have grown to a moderate Defence, and when it will be in its full Perfection: therefore let him, against such Years as the Shelter will be most Perfect, sow those Crops that root the most slightly, and leave the Ground most open between them, for they will least of all bear Drought. This last-named Article is more important than is imagined, for the Earth parches much sooner where it is exposed between the Plants, than where their Branches shelter it; and on this depends greatly the different Effect of Corn and Pulse upon the Ground.

The Husbandman's own Discretion will carry him on to sow, for the Time of middle Growth of his Fences and Trees, such Crops as require a moderate Shelter, but will not very easily be parched up: but the great Consideration is with Respect to the Years in which the Fences will be barest. We have directed him to sow such a Crop as requires most Shelter, at that Time when the Hedges and Trees are thickest. We will suppose this the Year before the Trees are to be lopped, and the Hedges cut down: the next Season therefore is to be that in which the Fields will be left most of all exposed; and consequently, if a drougthy Year come, the most disadvantageous.

Of all the Plants introduced into the Husbandman's Profession, Saintfoin is the deepest Rooter, and it best stands these Accidents; therefore let the Husbandman provide a Crop of this against the cutting of his Trees. Let him sow it early, and as it will then enjoy the Benefit of the thick Shelter while young, it will thrive so well as to establish itself in the Ground before the lopping and cutting. It may then be left to Nature: it will stand the Exposure made by this
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necessary cutting the Fences; and as it is a Crop that lasts several Years, it may very conveniently be continued upon the Ground while the Fences are growing up, and the Trees recovering their Branches. When they are grown so as to afford a good Shelter again, the Saintfoin may be broke up, and the Ground will be in excellent Condition for another Crop.

We have mentioned Saintfoin as an Instance, but the Farmer is not tied down to this only Plant, he may take his Choice among all the deep Rooters, and they will bear this Management, serving him very well during the exposed Years, and preparing his Land for Corn.

It is well known that dry and barren Lands suffer the most from Drought: therefore this Care should be most of all taken with respect to them: the Fences for them should be planted thick, and the Trees at small Distances in them; we have before given the Farmer his Choice of several that very happily suit such Soils. In many Parts of the Kingdom, since Inclosures have become more general, Lands that were worth little while open, are come to great Value by this Article of Defence. The Crops on these Lands are least able to bear parching Winds, and therefore they the most evidently of all shew the Effect and Benefit of Shelter; but this Effect on them is sufficient to recommend the Practice universally, where there is Danger of these Accidents.

CHAP. IV. *Of suiting the Crop to the Soil to prevent the Effects of Drought.*

THERE are, as we have shewn, certain Soils which are more subject to have the Growth on them damaged by the Effect of Drought than others; and there are also certain Species which shew the Effect of those parching Winds, that attend this Accident more than others, and that are less able to bear it: these Considerations singly may be of Service to the judicious Husbandman, for providing against the Effects of this Temperature of the Elements; and when taken together, as we here propose to treat of them, they serve as a Kind of general Rule for his Practice.

We have advised him to look round about him, for the different Effects of the same Accidents on various Grounds: we shall now carry his Observation a little farther, and take in the State of Things in different Parts of the Kingdom.

We suppose the Farmer situated in some Spot where there are the common Accidents and common Advantages attending his Profession; but from thence we shall now carry his

Observation to those Places where a great deal of the Land lies low, and in the Way of damp and of Overflowing. The Soil in these Places, as we have before shewn, is usually a rich deep Mould; and where they have the Advantage of any tolerable Plantations about them, they are from their low Situation well sheltered.

In many Places Ditches are made to serve by Way of Fence. But this is an ill Practice on such Lands, for they are by this Means exposed to all the Damage of parching Winds. It is less than on dry barren Soils, but still it is considerable.

These Lands therefore we exclude from the present Observation: we speak of those which lie low, have a rich Mould for their Soil, and tolerable Shelter; of these there are Abundance about the Borders of the Fens; and if these be examined in the Years of Drought, they will be found then loaded with the largest and richest Crops.

Hence a Rule of Practice is very easily to be deduced. If the Farmer have such Land divided by Ditches, and it bears poorly, while he sees that of his Neighbours produce well; let him plant the Sides of his Ditches with Willows at moderate Distances, and as they have naturally a naked Trunk, let him set Osiers between them. The Method of doing this we have delivered before, and the Effect in this Case will be very great. The tall Heads of the Willows will cast a proportioned Shade, and the Osiers, which are full of Leaves down to the Bottom, will keep off the Winds.

Only particular Crops will thrive where the Lands lie very low, which is usually the Case where there are these Ditch Partitions; but all these Crops will receive vast Benefit in dry Years from this Fence.

We have advised the raising of Saintfoin on the Ground, that is to be left exposed by the cutting of the Hedges, and topping of the Trees; and we shall add, that on this Occasion it is the Farmer's Business to sow his Crops removed from those higher and more exposed Fields on this Occasion, upon the lowest Grounds he has, and those which are best sheltered.

The Saintfoin on the exposed Ground will so cover the Surface with its Branches, that if a hot and droughty Summer follow, it will be much less affected by it; and the Herb receiving its Nourishment from a great Depth, will flourish, because the Sun will not have Power to affect it at that Depth, when the superficial Part is thus sheltered; while the high Grounds

Grounds thus stand out a Year of Drought in their most defenceless State, with a good Crop upon them; the lower Lands will, according to their Nature, yield the best Crops of all.

On the contrary, if an unexpected wet Season happen, the Crop on the high Grounds will be the stronger and finer for it; and those on the lower Grounds must be assisted, as we shall shew when we come to that Head.

CHAP. V. *Of the Effect of Drought on Trees, and the Way to defend them from it.*

TREES, like all other Products of the Earth, are liable to be affected greatly by Drought; but it is only while they are young: they are at that Time destroyed by it more easily than Plants of the herbaceous Kind; but when they are established in the Ground, they remain unhurt by its utmost Violence. In this Experience confirms what is so plain from Reason, in the Effect of Drought, upon deep and shallow rooted Products. The principal Effect of this Accident is on the Surface of the Ground; and when the Root of any thing pierces to a proper Depth, the whole remains unhurt by all that happens above Ground.

We have recommended planting of Trees in waste Grounds and in Hedges, and we shall here obviate the great Discouragement attending that Practice, which is the frequent failing of the Plantation from Drought.

We have, in treating of Planting, mentioned the several Accidents of Wind and the like, with the Way of guarding against them: these destroy many Trees, but Drought more than all: and this especially where the Plantation is made on an exposed barren Piece of Ground.

These are the Places where Trees would be most desirable, but from the frequent Failure of them Farmers have entertained a Notion they will not grow. That Nature can raise and support them in such Places is evident, because we see them wild and of fine Stature, though it is so difficult to make them thrive when a Plantation is intended on such Ground.

Let the Husbandman imitate Nature. That is, let him sow the Trees, of whatever Kind, and not plant them. And as we have told him what is the great Cause of their failing, let him guard properly against it.

The Practice of laying Stones or Rubbish about the Roots of new planted Trees, is very good, and may be also used

for those raised from the Fruit; but we have prescribed a Method for the securing of smaller Crops from Drought, which may, under a proper Management, be transferred to these with great Advantage.

The young Tree is the only Consideration in this Case, for when established it is safe; therefore let a Defence be raised for it while in that State. It is easy to sow something of this Kind at the same Time with the Tree, and they will rise together.

It is true, every Shrub for Shelter will not thrive upon these barren Grounds where we propose Plantations, but there are enough that will. A poor Ground in an exposed Field is the proper Soil for Furze; for we see it on the worst Ground, on the bleakest Heaths and barrenest Hills, flourishing well. This therefore will grow from Seed in these Places, and nothing can be more proper for the Service. Therefore when the Husbandman sets about a Plantation on this Kind of Ground, let him, at a Distance, round every Spot where he intends a Tree shall stand, sow a good Quantity of Furze Seed in a Circular Trench.

This will defend the young Shoot of the Tree from Winds, and also from Cattle. By this single Contrivance the Shoot will rise prosperously, and when it is out of Danger the Furze may be cut up for Use. Thus will a fair Plantation be raised by Nature's own Means; and it will succeed in the same Way as those which are established in like Places naturally. They have risen from the scattered Seeds or Fruits of the same Kind, and have stood their Chance and throve without those Advantages, therefore doubtless these will do better.

If, after the Furze is removed, the Trees appear not to thrive well, from the Heat and Dryness of the Season, and from the Exposure, let the Farmer order a Bank of Earth a Foot and a half high, and a Yard broad, to be raised round the Bottom of every one of them, and they will immediately shew the good Effect of it in their reviving; this presses and strengthens the Earth about their Roots; and it gives them, in some Degree, the Advantage of deep rooting, which we have observed to be the greatest of all Defences against Drought.

CHAP. VI. *Of preserving Water for Cattle in Seasons of Drought.*

WHILE the Crop suffers by the want of Rain, the Stock of the Farmer will be endangered by the drying up of the common Reservoirs of Water: the utmost Care is therefore to be taken to preserve what there naturally is; and to obtain more from other Sources when that no longer serves.

The common watering Places for Cattle, where there is not the Advantage of Brooks and Rivers, are certain Pits deeper or shallower, dug purposely, or on other Occasions, which receive the Rain of the wet Months from the higher Ground, and preserve it during Summer. These are so essential a Part of the Farmer's Concern, that they must never be neglected.

Let him take Care to clean them at proper Times, that there may always be a due Cavity or Depth for receiving the full Quantity of Water. The Mud thrown out of them will pay the Labour, so it is doubly wrong to neglect it.

Let him examine whether they be well situated, and consider whether they be of sufficient Bigness. If they are not in the best Places let him have others dug where they should be; and if they be well placed, but too small, let them be sufficiently enlarged.

The Observation of one Season, especially if it be a dry Year, will inform him how to judge in this Particular.

When the Pits are well placed, and of a due Size, let him observe how they hold the Water. If they become dry in the Time when they are most wanted, let him look into the Cause, and grudge no Price in, every Way, fitting them for the Purpose; for there is no Proportion between this Expence, and that which must lie upon him to supply his Cattle from other Resources when they are dry.

Two Ways there are of a Pond's losing its Water, and they are equally mischievous, but equally within the Reach of Remedy. The Water may be lost through the Bottom, or evaporated from the Surface, or both may conspire to drain the Pond, and then there is no Hope of its remaining long in a Condition of Service.

Let the Farmer, when he digs a new Pit or Pond, provide against both these Accidents; and when he sees an old one fail, let him examine whether one or the other, or whether both be in the Cause; and apply his Remedy accordingly.

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Let him observe how those Ponds are conditioned that hold Water best, and imitate by Art what he sees in Nature. When he casts his Eyes about in a dry Summer, he shall see many of the largest Ponds altogether dry, and find in the Field many a small Hole well supplied. Some old Sallow, or other such Tree, grows at the Edge of it, and under this the Water keeps quiet, cool, and fresh in the greatest Heats. Let him examine the Bottom in these Places, and he will find it Clay; or if otherwise, a Coat of stiff Mud covers the proper Soil, and answers the same Purpose. This shews that a sound Bottom and a covered Surface are the two great Articles for the preserving of Water. Therefore let him, in all new Ponds, clay the Bottom well, unless they be dug in natural Clay; and in all old ones, that lose their Water by its sinking, repair their Bottoms, or coat them altogether fresh. If a good Clay be used for this Purpose, and careful People employed to work it down, the Remedy is absolute, for a Bottom of this Kind will hold as well as one of Lead.

When the Bottom is taken Care of, so that no Water can sink, the next Attention is to be employed on Evaporation. The Sun dries up Ponds very much; and the Winds more. This is less obvious, but equally true. In their Salt Pits in FRANCE, where they evaporate Sea Water for making of Bay Salt, they find one Day's Sun, with a brisk Wind, takes off more of the Water, than three Days of the same bright Sun in a Calm.

The same Precaution that defends the Water from one of these, preserves it from the other; this is the sheltering it at the Edges. Let the Farmer keep in Mind the old Sallow, which he sees over the Pond that retains the Water in its Hollow, while others are dry. This is Nature's Method, and this he should imitate. Let him plant all about his new made or new bottomed Pond, except in one Place, which is to be left free for the Cattle to come down to the Water; or if it be in common to two Fields, which is a very good Practice, let him make two such Openings. Let all the rest be planted with any of the Trees that will thrive in a wet Soil; but of these none is better than the Kind already named, the Sallow, for it grows quick, and its Leaves do not give any ill Taste to the Water. The Boughs of these Trees, as they grow, should be made to stretch and meet from the two Sides, over the deepest Part of the Pond. The Sun will thus be kept off, and the Wind will have no Power. The Water will be kept in, and will be clearer than when it is disturbed by every

every Blast. As none of it will be lost, there are very few Summers in which Drought will be able to effect it.

If there be any where, in the adjoining Ground, a Spring, that should always be brought in, and a good Conveyance made for the waste Water; the Consequence of this will be, that there will be a Constancy of fresh Water, and yet the Ground will be kept dry. The frequent Rains with us make our People neglect the Care of these Reservoirs of Water too much; but in other Countries they are extreamly nice and curious about it, and if we took their Example, many of the disagreeable Consequences of Drought would be prevented. When the Farmer makes a new Pond, or new clays the Bottom of an old one, let him be careful to do the Work perfectly, for if there be the least Defect where the Water can make its Way out, nothing will do but new working over the whole.

For a new Pond, one Coat of Clay, of eight Inches well ram'd, and another of six Inches, covered with rough Stones, is the best Method. For the new bottoming an old Pond, a single Coat of Clay, and the covering of Stones, will answer the Purpose very well and very securely.

C H A P. VII. *Of obtaining Supplies of Water when the common Ponds are dry.*

AS the common Ponds will easily be exhausted in a Season of Drought, and the better made ones will sometimes fail; it is needful to consider farther what may be done in such Extremity; for a Supply must be had somewhere, or all will be lost. Thirst to Cattle, as well as to Mankind, is more terrible when in the Extream, than Hunger, and is as certainly fatal in the End.

We have mentioned, in the preceding Chapter, the taking Advantage of Springs for the Supply, when they lie near the Surface: when they are not to be found there, they always may be had at greater Depths; and this is the proper Resource, indeed the only one. Wells must be dug in fit Places, when all other Supplies of Water fail. It is often a discouraging Thought, to consider to what Depths it may be needful to dig in this Case for Water, and what Expence may attend it; but, on the other hand, there is the absolute Necessity of the Water, and the Certainty of the Supply: for Water may be had any where, if the Expence of digging be not spar'd. The Construction of the Earth is such, that there every where run Courses of Wet at different Depths, usually near
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the Surface, and rarely at a great Distance under it; wherever they lie they must be found on these extream Occasions, or all will be lost.

When the Well is deep, and the Supply of Water that is required from it is great, there must be proper Contrivances used for the getting it up. Men may be employed to draw it from small Depths, and in moderate Quantity; where more Labour is required an Afs may be used, or where there is Need, Assistances may be employed, drawn from the Principles of Mechanicks.

The Wheel in which a Beast walks to raise Water from a deep Well, is a very good Contrivance: a double Wheel, with Coggs, is another excellent Method, because it makes the Draught easier than in the common Way. The double Wheel, with a long Line to the Hand, is also another Improvement, because the Weight rises much easier.

Where there is a large Stock to be watered, the common small Buckets are not to be used, for that would be endless; and in Proportion as larger are required, and the Weight to be drawn up is encreased, the more needful it is to be careful of the Force and Assistances in drawing. A very good Way of drawing great Quantities up with Expedition, is to place a large Wheel at the End of the Windlas, four Times at least the Diameter of the Windlas. A thick Rope is to be fastened to the Bucket; and a smaller of due Length is to be wound round this great Wheel. The Length is to be such, that when the Bucket is in the Water, the small Rope is all wound upon the great Wheel, and the Bucket being filled, a Servant is to take the End of this small Rope and go forward, till, as that unwinds, the Bucket is drawn to the Top.

Those who are not acquainted with the Powers of Mechanicks, can entertain no Notion of the Effect this has. A single Man will thus be able to draw up a Bucket of twenty or five and twenty Gallons, and that with great Expedition, and little Labour. This is a Thing of vast Consequence, when large Draughts are required.

A good Contrivance, in Case of these large Buckets, is to have them made so that they shall fill without turning sideways, and this is very easy. A large Hole is to be made for this Purpose in the Middle of the Bottom of the Pail, and a Cover is to be fitted to it in the Manner of the Sucker of a Pump; in this Case, as soon as the Bottom of the Pail reaches the Water, the Hole will open and the Bucket will presently fill; then, as soon as it is drawn out of the Water, the Cover stops

stops the Hole and it comes up securely. This prevents the sinking of the Bucket, and a great deal of Trouble.

Any Wheelwright will be able to make such a Wheel, and it will be a very good Method to make it with Teeth, and with a Ledge of Wood so falling upon it, that as the Servant moves forward in the drawing, nothing stops the Pail; but as soon as it is high enough, the Ledge of Wood bearing against the Teeth, stops it. The Structure of a common Jack Wheel will explain this easy Piece of Workmanship.

The Way to be most expeditious in raising Quantities of Water by this Method, is to have a Receiver for a great deal of Water placed ready near the Well, and a Trough long enough to reach from the Ledge of the Well to it. This Trough is to be placed under the Bucket, and it will be easy by fastening a Cord to the Cover of the Hole within the Bucket, to pull it up when the Trough is set under: thus the Bucket will both fill and empty without turning down, which will be a great Ease and Convenience in such a large Size.

This is a Method by which the Farmer will be able to supply his Stock always with Water, in Seasons of Drought, but it is expensive, and takes a great deal of Time to begin and finish it. Therefore as the Cattle might be lost while it was doing, if never thought of till wanted, the Farmer in a large Concern, where he sees there may be a Necessity of such Assistance, should have it ready in Time, and at the Expence of his Landlord; for the Well will serve successive Tenants, and therefore is not to be the Charge of one.

Where such Contrivance is wanting, let the Husbandman look carefully about, and see if there be no Place in the higher Ground where the Water is detained. Ponds on the Tops of Hills are not uncommon, and where there is Water above, it is easily brought down to be of Service. In this Case, his Care should be to keep the Pond at the Top well sheltered and well bottomed, that all that comes to it may be preserved in it; and then Pipes are to be laid from this to the Place where Water will be most needed. One should be always carried to the House, and another to a Place where the Cattle may be conveniently watered. Thus will a Supply be often preserved, when all others, except deep Springs, fail; and in this Way, there is nothing of the Trouble of drawing up and emptying, as in the others.

It is frequent that Springs rise on the Tops of Hills: these will fill such Ponds, and afford a lasting Resource: but without these the Assistance of such a Supply is very common. I shall refer the Reader about LONDON to one familiar Instance. On
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the Right Hand Side of the Road to HARROW, about a Mile from PADDINGTON, is a very considerable Farm, occupied by Mr. GODFREY. It is near the Top of the Hill. After a few more Paces you arrive at the Top, which is a Flat of no great Extent, dropping off every Way again: there is a little sinking in this Ground toward the Middle of the Flat, and in that Place is a large round and deep Pit. This is always well supplied with Water; and from this Mr. GODFREY has Pipes laid, which go to his House, and afford a continual Quantity for all needful Uses.

At first Sight, a Person might imagine there was a Spring in this Place; but I have examin'd and found it otherwise. The Soil is all a hard firm Clay; by this Means the Pond is as well fenced to keep Water as if it were leaded; and though exposed some Part of the Day to the Sun, its Depth to the Surface shelters it very well from the Wind. It receives the Water no other Way than from the Rains that fall upon the Flat, at the Top of the Hill; but the Soil there being all the Way Clay, it takes almost all that falls on the whole Surface. Very little is absorbed by the thin Coat of Mould which covers the Clay in that Place, and the rest sinking toward the Pond, is received into little covered Drains, that discharge themselves into it.

Nature has, in many other Cases, given the same Opportunities of supplying a Farm with Water, in Times of Drought: it were well if others had made the same Advantage of them.

This is the most rational and best Method of bringing Water from a higher Place down to the Farm; on the other hand it may often be necessary to bring it up from a lower, when the Cattle cannot of themselves get at it. In this Case Recourse is to be had again to Mechanicks. There are various Ways of getting Water up from below, some suited to larger and others to smaller Purposes: of all others the most convenient to the Farmer will be the PERSIAN Wheel, which we have named before. This is constructed at a moderate Expence, and will last a long Time, being not liable to be often out of Order; and the Quantity it will raise is sufficient for all possible Purposes in the Service of the largest Farm.

CHAP. VIII. *Of the Signs and Notices of Drought to be observed by the Farmer.*

AS a Continuance of dry Weather, in the Heat of Summer, is the Source of this terrible Calamity to the Husbandman, he will naturally be terrified with the Apprehension of

of it, oftener than injured by the Thing itself. It will be natural for him, on any long Series of hot and dry Weather, to fear he shall not have Showers; and as he will be in the right to provide against the Disaster as early as he can, it will be of great Use to him to make a rational Guess, whether the dry Weather that at any Time alarms him, is, or is not likely to continue.

We smile at many of the common Prognosticks of the Weather, and acknowledge that those which are better founded are uncertain: we could therefore have gladly dropped the entering upon the Subject at all, but that we think it may be of real Service to our Readers; therefore we shall lay down such observations, as are most likely to inform the Husbandman what he is to expect; cautioning him never to have Recourse to them but in continued dry Seasons, and then to judge of them as we deliver them, not as certain, but in some Degree probable; accepting them as the best Guides he can obtain, and therefore consulting them for Want of such as would be less dubious.

Prognosticks of Weather are seen in animal and in vegetable Bodies; not only such as are living, but in the Parts and Preparations of them when dead.

It is plain from repeated Experience, that Birds, Beasts and Fishes are warned of the Changes in the Air, by Notices that either do not reach us, or that we do not regard.

We see in the Weather Glasses the great Effect of Changes in the Air; and we perceive it also in many other natural Instances.

These all shew that Changes of this Kind affect both solid and fluid Substances; and therefore, that we may seek for them, and observe the Marks of them, as Notices of succeeding Changes or Continuance of Weather, in almost every Object that is before us. In Things inanimate, we can only perceive them by Examination. A Board will swell against Rain; but if we do not observe and examine it we shall not see it: but in living Creatures their Actions shew what they feel; their Bodies are affected by the Changes of the Air, and they are guided by Instinct, more certain than Reason, and more inviolable; therefore we may observe their Actions as Prognosticks of what will happen in Consequence of what they feel.

These Creatures are the more sensible of all Changes in the Air, because they live exposed to it, and can feel no Changes but what are natural: Mankind who live in Houses alter the Temperature of the Air by Fires, and are by that Means made incapable to judge of its real Variations. The Change from
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the Air of a Room with a Fire, to that of a Field or Garden, is so great, that it quite drowns the small Variations which may have happened in that free Element; rendering them commonly imperceptible, and when they are greatest of all, confused and uncertain.

For these Reasons, we must conceive that other Creatures are more sensible of these Changes than we; and as they have Motion and Voice, we are to watch both for the finding out their nicer Feelings.

Slight Changes in the Air are so frequent and so sudden, that nothing can be expected to be thus made out from them: therefore, let the Farmer never seek after these Signs of them, but when a settled and continued Season of one Kind, has made it natural and necessary for him to look after every Notice of another.

In this Case of Danger of Drought, if there be Herons in the Neighbourhood let him observe their Course. This Bird delights in a lofty Flight, and will indulge itself in it, when Opportunities of satisfying its ravenous Appetite do not call it lower. When the Heron flies high in the Middle of the Day, it is a Sign the Dry Weather will continue. The Food of this rapacious Bird is principally small Animals, that haunt about the Waters. Fish are its Delight when it can catch them; but they are too swift in their Motions for its general Supply: Frogs, black Snails, and other such Creatures, are its common Prey. The Dews of the Night call out these early in the Morning, and this is the Heron's Time of preying. When the Earth grows dry, and the Sun hot, they retire into their hiding Places, and the Bird indulges himself in his airy Flights. This is his Custom in dry Weather; but if there be a Change for Rain, these Insects feel it, and they crawl out of their Holes by Day. The Heron feels it also, and Instinct guiding him, he descends in Search of them: his Flights are low, and he is frequently stooping.

Upon this rational Principle depends the Sign of Drought from the Heron's flying high; and it is one of the most certain that are to be gathered from the Bird Kind; but it is not on any one of these the Farmer is to build his Opinion: Things doubtful are no Way so well confirmed, as by being supported one by another.

All Beasts are rendered faint and languid by a Continuance of hot dry Weather; and while they continue so, 'tis a Sign the Cause will continue. The Farmer, to know what he is to expect in this Matter, should watch the Actions of his Stock, while they seem inactive and dull; while they rise late

late to their Food, and eat it carelessly, it is a Sign the Drought will continue. They feel the first Approaches of Rain; and before the Farmer sees the Clouds toward it in the Sky, he may know it will happen by their Conduct. After a long Series of dry Weather, the Sheep will rise an Hour before their Time to feed. When Rain is coming they and all the other Cattle will feed heartily; their Motions will be brisk, and the Cows and the Oxen will toss up their Heads and snuff the Air with Pleasure.

When the Farmer has these Notices of Rain from the Bird and Beast Kind, he may give up his Fear of Drought; for Showers rarely fail to follow. Many more might be named, but these after a long Drought are certain the most.

To these Signs from the Birds and Beasts we may add some from Fish and Insects, but they are not of equal Certainty; they will serve as a Confirmation of the others, though less authentic alone.

If the Farmer has a Pond with Fish, let him from time to time look into it carefully. If his Fish keep out of Sight the Drought is likely to continue; and on the other Hand, if they come up to the Surface after disappearing many Days, he may imagine there will be Rain. Fish love Air, but it must be a moist Air; and they feel it even under Water.

This is another though a less Reason of the Heron's leaving his high Flight when Rain is coming. He has no Chance for Fish while they all keep in the deep Water; but when they rise in the Shallows he may surprise some of them.

Eels keep all Day deep in the Mud in dry Weather; but they will often put up their Heads on the Approach of wet, and sometimes crawl on the Surface. These, more than any other Fish, are the Prey of the Heron; and this is another Cause of his leaving the airy Heights of his dry Weather Flight, when the Approach of wet calls them out. Added to Instinct, here may be the Assistance of Eyesight. The Sportsmen know from what a Height Hawks will see: the Heron has Eyes of the same piercing Kind; for all Creatures have their Organs suited to their Uses: and the Sight of Fish rising to the Surface, and of Frogs crawling out of their Holes, may bring this Bird down, as well as the Guidance of Instinct upon his Feelings.

In long Droughts Worms penetrate deeper into the Ground. This is natural, for they must have Moisture: their very Skins also dry up when exposed to a parching Air, and it is certain Death to them. In these Continuances of dry Weather they rarely come Abroad: and while the Farmer sees nothing of

them or their Casts upon the Earth, he has Reason to fear the Drought will continue.

These are the principal Signs of continued dry Weather from living Creatures; but there yet remain other Observations for the Husbandman on Things inanimate on Earth, and in the Skies: all these he is to observe; and joining them with the others he will seldom be misled in his Opinions.

When all the Wood Work about his House and Yard moves loose and easy, and the more flight or coarse Works rattle in the Joints, it is a Sign the dry Weather will continue; and when the Surface of Marble or smooth Stone in Chimney Pieces and Floors is perfectly dry, it is also of the same Purpose. We speak here of Rooms in which there are no Fires; for they will change the Nature of all these Signs.

With Respect to the Heavens, let our Farmer observe the Sun at his Rising; for he is an ill Husbandman that is not up before him: if he rises small and blue, too bright to be looked upon, and in a clear Sky, there is all the Appearance imaginable of a continued dry Time. When there are rainy Vapours in the Air, they enlarge his apparent Bigness, and shew him of a fiery Colour. In great Droughts the Sun constantly rises of the same Size as he is seen all the Day, and of the same intolerable Brightness.

At Night let the Husbandman watch the Moon and Stars: if they are bright and clear, there is the same Reason as from the Sun's Brightness to believe the dry Weather will continue. If the Horns of the new Moon look particularly sharp, that also is a Sign of its lasting.

All these Observations depend upon the same Principle, the Clearness of the Air through which we see them. To speak to a Philosopher we should only say, a clear Air in dry Weather is a Prognostick of its continuing dry: but to the Farmer we explain the Matter by Instances.

The Clouds may give some Signs of Drought also; though from their fleeting and inconstant Nature, less Dependence is to be placed on them than on the other Tokens. Thus if the Sun set red, that is, if there be a light red Sky in the West at Evening, it is a very strong Sign of the Continuance of dry Weather; especially if the East be free from Clouds at the same Time. In the same Manner, when only a few light loose Clouds are seen in the West at Sun-rise, and they soon disperse, it is a Token of the Continuance of the dry Time.

The last Thing we shall direct the Farmer to observe as a Guide, to judge of the Continuance of dry Weather, is the Wind: let him watch this carefully. The North and the East

East are the fair Weather Winds in ENGLAND; the South and the West those which often bring Rain.

When the Wind seems settled in one of the dry Quarters, or in changing goes only toward the other, there is the greatest Probability that his Birds, Beasts, and all his other Observations, have told him true, and that he is to expect a Season of Drought: and in this Case let him prepare for it.

There are lesser Observations to be made for the foreseeing sudden Showers and Days of clear Weather, in the common changeable Course of Things: these we shall treat of as lesser Signs under the Article of Rain; but in this Place we are considering a Thing of much more Importance than those sudden Variations.

We have laid down a Number of Observations from different Sources, all tending to the same Point, the long and settled Continuance of dry Weather; the Consequence of which in the Extream is Drought. When the Farmer sees one of them, let him examine whether the Rest hold good; and if they all do, prepare against the Accident they threaten; let him secure and preserve his Water upon these first Notices, and if they continue any Time, as the present Examples seem to foretell they will, let him begin seasonably to obtain such Recruits as will be absolutely necessary; and in this let no Evasion take him off, nor any Expence deter him. His Neighbours will be in the same Condition with himself, so they cannot supply him; and it is very probable that the Consequence may be the loss of great Part of his Stock.

C H A P. IX. *Of Rains.*

WE are here talking of the Extrems of those Things, which are in themselves, when properly moderated, of the utmost Advantage and Use: Heat was the last named, and Moisture is to be treated of in this Place. Both are needful to the Growth and thriving of Plants; and they are indeed the two great Requisites to that Purpose: but both may be destructive, both to the Crop and Stock of the Farmer. 'Tis a Proverb, that the best Things when improperly conducted may be the worst; and it is in nothing so true or so evident as in these Articles. We are not to arraign the Wisdom of Heaven, which doubtless, when it suffers these Evils to fall upon the Husbandman, by that very Sufferance prevents greater: but in the plain Face of Things, Heat in Excess is fatal, because it brings on Drought; and Rain in Excess is destructive, because its Consequence is Inundation.

'Tis not impossible, that by the vast Rains of this late past Winter we may have escaped the Earthquake that overthrew LISBON, and shook as it should seem a third Part of the Globe. This Consideration may stop our Mouths from exclaiming against that Providence; which in Mercy to us has been thus seemingly cruel: but it is not to withhold our Hands from relieving us from the Consequences of this great Fall of Waters. They are not the less hurtful to the Farmer, because they may have served so great a Purpose in the Order of Nature; therefore he is to consider the Remedies for their Consequences.

All Lands will receive Damage by violent and excessive Rains; but those most which lie lowest. From the higher Grounds they wash away the Manure that may have been laid on, and even their finest Mould; this therefore must be replenished: but from the lower Grounds it is necessary to remove them, or they become Ponds or Bogs, not Meadows, Fields or Pastures.

This is an Accident the Farmer should always foresee and provide against. It is more frequent by far than Drought; and with Neglect every Year may bring it upon him.

Every Piece of Ground has some Declivity or Descent: his Business is to find that; to cut Channels in Readiness for the Reception of the abundant Water that shall fall upon the Ground, and to lead them according to that Descent to discharge themselves at the lowest Place.

We have shewn in the Words of an ingenious and worthy Correspondent, how accidental Floods may serve the Purposes of the Farmer in shewing him the true Descent of his Ground: these he is always to observe, for nothing will so well inform him how to carry his Drains. This Subject having occasionally treated on before, we shall not repeat any Thing here.

Beside the Damage that may arise to the Husbandman by the heavy and continued Rains of Winter, there are Seasons at which every Shower may reasonably alarm him. These are particularly the Times of Hay-making and Harvest. He is for the Success of these Operations to seize upon every good Hour that comes; and it will be of the utmost Importance to him on this Account, to form some reasonable Conjecture what Weather is likely to follow.

It is a Matter of Indifference whether he bring the Scythe into his Meadow, or the Sickle into his Field, one Day or another. There is a Time at which the Grass has most Substance, and the Grain is richest in the Ear; but this is

is not limited to a Day in these, as in some other of those precarious Crops we have named.

The Farmer may be tempted by fine Weather to begin both somewhat sooner than he intended; and he may, on the threatening Presages of Rain, defer them some Days. It is therefore of the utmost Importance for him not to deceive himself concerning this Article: and as it may with some tolerable Degree of Certainty be foreseen by many Means, we shall give here all that have Reason for their Foundation, among those Things that are generally supposed to forebode Rain.

We shall here, as in the foregoing Chapter, select those Signs for which there is Foundation in the Laws of Nature, and which we have known Experience to confirm; passing lightly over the others, and utterly rejecting the Fancies of weak and credulous People, which have too long imposed upon the Injudicious.

CHAP. X. *Of the Signs and Notices of Rain to be observed by the Farmer.*

IN general the opposites to all those Things we have set down as Signs of Drought are to be understood as Notices of Rain: therefore the Farmer recurring to our last Chapter on Drought, will there see the many Things that strongly presage Rain, as the contrary of those there named. Thus when the Heron flies low; when the Cattle rise early to their Eating; when Fish swim on the Surface of the Water, and Worms crawl frequently out of the Ground; when Wood swells, and Marble is wet on the Surface; when the Sun looks big at his rising, and the Moon and the Stars appear dull; when loose Clouds fleet about in the West in a Morning, and do not disperse as the Sun advances against them; and when the Wind is South or West, and changes only from one to the other of those Quarters, Rain is to be expected.

These are the Opposites to those Signs we have given of continued Drought: therefore having explained their Causes severally there, we need only recapitulate them here to the understanding Reader.

To these we shall add many more Accidents in Nature, which may be understood as general Presages of Rain; and which often precede the lightest Showers.

Birds feel the Approach of Rain as other Changes in the Air, and this always with Pleasure: a moist Air seems best suited to the Nature of all the Kinds that are wild with us;

and particularly to the Water-Fowl. It also brings out of their Lurking-holes the Myriads of Insects which are their Food. The Farmer should watch the Fowls of his Yard, and the wild Commoners of Nature, at all those Times when he fears Rain.

If his Geese and Ducks prune themselves, seem more than ordinarily chearful and lively; and the Crows in their hoarse Voice caw from the Tops of the Trees, he is to understand it as their rejoicing at a damp Air, and the Approach of Rain: these last named Birds are extremely sagacious. When they fly about tossing up their Beaks, and are very noisy, the Rain is coming: and when they stalk by the Sides of Brooks and Ditches, it is near at hand.

When Swallows fly low it is a very well known Signal of Rain, and is founded on the plainest Reason. The Food of these Birds is little flying Insects, and all these unable to bear up against the Weight of the Air when loaded with Damp, fly low. The Eye sees this, and Reason confirms it.

The Crying of Peacocks is another known Sign of Rain: it is that Bird's Note of Joy. His Voice is hoarser than the Crow's; but it is, like the cawing of that Bird, a Sign of his Satisfaction.

Among the Beast Kind Sheep shew the first Signs of perceiving the Approach of Rain; it makes them sprightly: they leap about and play with one another. The As's foretels it by his braying, which is also his Note of Satisfaction; and the Cows and Oxen by tossing up their Heads and licking their Snouts.

These are the Signs of Rain being gathering in the Air; but when it is just at hand Cattle give other kinds of Notice. They flock together to the Hedges, and seek Shelter under Trees where they may stand till the Shower is over, and whence they may proceed to the Grass sweetened by this Sauce from Heaven.

The very Insects may be of Use in this Way to the Farmer; their tender Bodies give them Notice of the Changes in the Air long before Men perceive it. The Bees keep within their Hives, and the Ants leave their busy Motions, and retire deeper into the Ground. They carry with them those Cases in which the winged Sex are lying for their Change, as the winged Insects of all Kinds do. These common People call their Eggs; but that is an Error.

From the Animal Kind we shall lead our Farmer for Presages of Wet to the wild Weeds of the Field, and to the common Producs of his Garden. The Poet speaks of
the

the closing of the Flowers of common Marygold at Evening: he calls it

The Marygold that goes to Bed with the Sun:

and this, and all the other Flowers which have that Quality, as there are very many that have, shut up in the same Manner more or less when the Rain is coming.

The youngest Flowers, or those most newly opened, have this Quality the most sensibly; and they are to be watched for it: dry Weather opens them fully; and as wet is nearer or farther off, or as there is more or less of it in the Air, they firm or draw together their Leaves in a more close or loose Manner.

In the Corn Fields the Farmer will meet with a little Plant famous for many Virtues, its Name is Pimpernell, he will know it by its small bright red Flowers: these open in dry Weather, and shut up against Rain. Wet may be foreknown a whole Day before it falls by this Flower; and the Country People in some Places are so sensible of it, they call the Herb their Weather Glass.

In the Pastures he will see many Heads of Dandelion gone to Seed: these are so many Globes of Down in fair Weather; but against Rain they contract themselves, and shew a very plain Mark of its coming.

From his Pasture let the Farmer look into his Clover Field, and he will find another Mark of Rain which has been observed these two thousand Years: the Clover when Rain is coming stands more upright and firm than at other Times; the Stalk is swelled and stiffer. This is true in the same Manner with many other Plants, but in none so distinctly.

From the Field if we bring him into his House, he will there find also the Signs of approaching Wet very frequent and very familiar. All Wood swells with the Wet, and the softer Kinds the most. Deal, which is the Timber of the Fir-Tree, and is one of the softest of them all, swells most of all; and its common Use in Houses gives Opportunities of seeing it. Doors will not shut; for both the Posts and the Boards of which the Door is made swell: Window-Shutters stick, and Boxes are hard to shut or open: Drawers of the same Wood also stick in their Cases; and those of other Wood do the like in Proportion to the Kind.

From these Things of common and small Concern, let him turn his Eyes up to the Heavens. We have observed, that the Sun's looking red and large is a Sign of Wet; and let him mind the Clouds that accompany this Appearance, for

they will not only confirm that Rain is falling, but in some Measure shew the Time when it will come.

If Clouds presently after such a Rising of the Sun gather in the Sky, and the Air appears thick and watery, then it will presently rain; and the hotter the Weather, the sooner the Rain is to be expected from his Appearance.

When at Sun Rise, or soon after, there be a Circle or Part of a Circle of a blueish or whitish Colour about the Sun, there may be expected Rain some time within the Day.

We have before observed, that a red Sun at rising is a Sign of Rain; and the same is to be added concerning its looking dull and white. The natural Colour of the Rising Sun in a clear Air is the same that it has at Noon Day, a deep fiery Blue, which the Eye cannot look upon a Moment. When he is dim and faint, and looks white, it is owing to watery Vapours in the Air, and Wet is near.

If the Moon have a large Circle of a whitish Colour round her at a Distance, it is another Sign of Rain: and when the Stars look larger than usual and fainter, and twinkle less, it also presages Wet the next Day: this Observation of the Stars not twinkling so much, the Farmer is to understand is confined to the fixed Stars; for the Planets, though larger than they, never twinkle at all.

The Clouds give also many Prognostications of Wet. When there are many small ones scattered about the West in an Evening, Rain is to be expected the following Day.

It is usual at these Times to see the Clouds large, thick, and massy, so that a fanciful Person may imagine among them Resemblances of Rocks and Towers. These are Signs of a great deal of Rain, and often of Thunder.

The Rainbow is a Source of many Prognostications respecting the Weather, and is not sufficiently understood. In general it bespeaks a Change: if it appear after a great deal of dry Weather, it foretels a great deal of Rain; but when we see one after a great deal of Wet, we may expect fair Weather.

A bright Rainbow in the East is usually followed by a great deal of Rain.

Mists from Waters afford also a regular and very certain Prognostick of the succeeding Season. When they are thick in the Morning, and presently after disperse, they are Tokens of fair Weather: but when they rise to the neighbouring Hills, and hang in the Air, they usually presage Rain, though commonly at a Day or two Distance.

These

These are the principal Notices from the various Works of Nature, which the Farmer is to observe as threatening Rain, during his Summer Works; and as it will be of the greatest Consequence in Respect of these, to know from all Methods when he is to expect proper Weather, as well as when he is to fear such as will be hurtful: we shall add those several Appearances from all Kinds of Objects, in Consequence of which he may reasonably promise himself a fair Season, for the cutting, drying, and carrying in his several Products.

C H A P. XI. *Of the several Signs of fair Weather.*

WE have before spoke of those continued dry Seasons in hot Summers, which bring on Drought and are in the highest Degree detrimental to the Farmer; but what we are here to speak of is, that Kind of fair Weather which comes in seasonably, and lasts properly and in a natural and useful Manner: such clear Seasons as come between the showery Times, and serve for the gathering in the Produce, without Wet.

The several Signs by which he may probably know such Seasons are approaching are these. A clear Sky in a Morning, and a bright Sun-rising in it, are the natural Tokens of a good Day; and when at Evening he sets in a light and bright red Sky, and without heavy Clouds, there is Reason to entertain good Hope of the next.

Next to the Sun the Moon is to be observed. At all Times when she looks bright and clear, and has no foggy Circles round her it is well; but the greatest Promise is from her Appearance a few Days old. Let the Farmer, whose Harvest Time approaches, watch well the new Moon. If he see her Horns sharp, clear, and fine, he may reasonably expect fair Weather till her Full; and probably enough it will continue much longer.

The Stars give the same Token of fair Weather as the Moon, and just in the same Manner. When they look very sharp and bright, and twinkle strongly, there is a clear Air, and it is like to continue.

White, small, and scattered Clouds at the North East, are also a Token of several Days fair Weather.

On Earth the Farmer will find Means of Information in this important Article, as well as in the Heavens. Let him look to the Hills, and if he sees their Tops clear he may expect bright and serene Days: even the Stone and Brickwork
of

of Buildings, in some Degree, gives the same Notice to the Eye. It is seen more clear and distinct in the pure Air, that brings in fair Weather, than in such as is full of watery Vapours, and precedes and presages Rain.

Light Mists, of a white Colour, gathering early in the Morning over Waters, and soon dispersing, are Signs of fair Days.

If a Shower happen, and there be a Rainbow, let the Farmer watch it carefully; if the blue be a strong Colour, and the yellow be bright, it is a Sign of clear Weather quickly following.

When Gnats swarm in an Evening, and the Glow-worm crawls Abroad at Night, good Weather generally follows. These tender Insects dread the Rain as fatal to them, and hide themselves when Instinct gives them Notice of its coming. Their swarming Abroad therefore is to be observed as an Information of fair Days succeeding, given to Mankind by their Actions. Instinct guides them; and Man's Reason is to be directed by it.

The Bee is also a sure Director. Her little Organs feel the Approach of Wet, and keep her Prisoner in her Hive, or limit her to short Excursions when it is near: therefore when she flies far, and returns late, good Days are coming.

Next let our Husbandman observe the Birds. When the Kite and the Swallow fly high good Weather is coming. They can see their Prey to a greater Distance in that clear Air that presages fair Time; and they love lofty Flights.

When the Sea Birds leave the Shore; and when the Owl hoots softly, gently, and composedly, fine Days may be expected.

Fish and Insects join also in giving these Tokens. When the Roach and Dace leap up out of the Water, and when the Spider hangs its light Webs in the Air, fair Weather is coming: Experience, more than any certain Reason, establishes this Token from the Fish. As to the Insect it is plainly the Direction of Instinct. Its tender and exposed Body feels the Change of Air for dry Weather; and Instinct directs it on that Notice, to venture out its Threads, because there will be nothing to hurt them.

Lastly, we shall give the Husbandman a Notice which he is to regard more than any of the preceding, because it answers doubly, as a Promise of fair Weather for the present, and a Denunciation of Rain soon after. This is that thick dark Sky we sometimes see for a Continuance of Time, without either Sunshine or Rain. This is a Thing that frequently

quently happens in ENGLAND about the Harvest : and the greatest Regard should be had to it : it is an unerring Rule, that such a Sky is followed by some fair Weather, and that Rains come soon after. Therefore let the Farmer manage his Business accordingly.

He needs not be afraid of sudden Rain, where there is such a Sky. He may proceed in his Employment, assuring himself that though Rain will follow, there will be an Interval of fair between, which will serve at the same Time to finish his Work, and to give him Notice of Wet to follow, from which he is to guard his Crops.

C H A P. XII. *Of Hail.*

HAIL is an Accident much more dangerous to the Gardener for his forward tender Crops, than to the Husbandman, whose Products being at all Times exposed to the Weather, are more hardened : when it happens to be very violent, and the Stones very large, it will do him some Damage ; but it is less to be foreseen, and less to be guarded against than any of the other Accidents of Weather. In the warmer Parts of EUROPE it is often terrible to the Husbandman, because the Heat brings his Crops as early forward in the Field as ours in a Garden : but neither there can he foresee or guard against it.

Those Storms in those Countries are less frequent than in ours, but sharper. The Roman Catholick Religion established in most of those Kingdoms, throws them into the Mockery of Processions, and solemn Rites ; and as these Storms never are very lasting, they attribute the ceasing of them to those Solemnities. God, who commissions all these Things for Purposes unknown to Man, though intended for his Benefit, is not to be averted from his settled Intent by their ignorant Prayers. The Pagans who beat Drums when the Sun was eclipsed, were about as wise, and had as much Share in the bringing Light again. Submission under Afflictions, and general Prayers, are the Dictates of Reason in these Cases : the Language of the prudent Heart should be, " Thou knowest what is best." And the Christian Resignation is, " Thy Will be done."

All the Husbandman can do in these Storms of Hail is, to watch whether they seem to be slight and common ; for in these, as we have said, there is very little Harm to him ; or whether they threaten to be very terrible : in the former Case he is to leave all to Nature ; and in the latter he should be quick

quick in driving under Shelter, all such Parts of his Stock as could be hurt by it; his Lambs and other young Creatures. His Crop he can no more shelter than he can remove it, therefore it must take its Chance; but as we have observed the common Season of Hail is at a Time when that is not of a Growth to suffer any great Damage.

As we have, on all other Occasions, endeavoured to make the Farmer acquainted, in some Degree, with those several Things wherewith he has any Concern, we shall add here a succinct Account of the Nature of this Substance.

He is acquainted with the Nature of Rain, which is Water raised in Form of Vapour by the Sun, and falling again in Drops. These Drops often pass through a considerable Depth of Air, before they reach the Ground; and it sometimes happens that they are frozen by the Way. Every one knows what a frozen Drop of Water must be: it can be no other than a small roundish Piece of Ice; and whoever will examine Hail-Stones will find them such. Observations have been made, in particular Cases, of Hail-Stones of odd Shapes, as long, or flat and thin, and Star-like, but all these are uncommon. With Respect to the long and flat, they seem only the Effect of various Degrees of freezing; but the Star-like Hail, which is observed to have six regular Rays, is of another Origin. Those who have examined these Matters nicely, will find no Difficulty in the accounting for that Shape: it is the natural Form of pure Flakes of Snow. Therefore, as the common Hail consists of Drops of Rain frozen in their Passage through the Air; this is composed of Flakes of Snow, frozen to the Hardness of Ice, in the same Manner. What the more confirms this is, that these starry Flakes of Hail are always thin and light.

Though these fall with less Force and Weight than the others, they are often attended with more Damage, especially to the Gardener; for when they are driven before a violent Wind, their sharp Edges cut off the Blossoms of Fruit Trees like so many Knives.

A very good Practice in Gardens on this Occasion is, to stick in Pieces of Furze Bush among the Branches of the Fruit Trees, to keep off the Hail from the Blossoms. We name this here, because it may be transferred, if there be Occasion, to the Field, if the Farmer have any young Crop for which he is in Fear from Hail Storms; he may with little Labour or Expence stick up large Furze Bushes among it at certain Distances, which rising above the proper Growth will, by their bushy

bushy Heads, defend it from the Fury of these Storms in the same Manner as in the other Instance.

This is a Caution never needful, except upon particular Occasions, and they are not to be foreseen. Indeed this is the Misfortune with Respect to all the Damage by Hail, but when there is Notice, as there commonly is, of any very violent Storm, it is worth the Trouble of a little Care. The driving in of Cattle and Poultry is the Principal; and 'tis better this should be done when there was no real Necessity twenty Times, than once omitted when there was.

Mischievous Storms of Hail generally are of small Extent, and may be foreseen a little before their coming, by a thick, black, heavy Cloud, with Chillness in the Air and Wind.

Toward the End of APRIL, in 1697, there was one of these terrible Storms in CHESHIRE. A black Cloud of this Kind foretold its coming about a Quarter of an Hour. This was Time enough to have got in the tender Cattle, but the Farmers were not aware of the Danger, and they suffered Terribly. The Breadth of this heavy Cloud was about two Miles, and the Course it took before it dissipated was sixty Miles; along all this Tract there was made the most terrible Havock of every Kind, but not the least beyond or beside it. The Hail Stones in this Storm were as big as Hens Eggs, Geese Eggs, and some of the full Bigness of a Man's Fist. They were Pieces of clear transparent, and very hard Ice, with a white Kernel in the Middle, that seemed a little Lump of Snow. Some of these vast Hail Stones were quite smooth, and others rough and sharp on the Surface. They fell with a prodigious Force, and killed Fowls, Lambs, and Calves; beat down the young Crops of every Kind; and, in some Places where the Wind drove them slanting, plowed up the very Surface of the Ground, and buried themselves an Inch or two in Depth; Trees were broke and shatter'd to Pieces in many Places; Houses damaged, and many People that were Abroad much hurt.

The Circumstances of this Storm are recommended in the Philosophical Transactions, and in many other authentick Writings; this, and other Instances, are not recited here for Curiosity or an idle Amusement, they are to stand as so many Lessons to the Farmer: Examples of the Losses others have sustained by neglect of driving in their young Cattle; and Cautions to himself for a wiser Conduct. He sees what Appearances in the Sky foretel these terrible Storms; let him be upon his Guard accordingly, watching when they come, and omitting no Care that may prevent the Damage.

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There is recorded in the same authentick Papers, another Hail Storm the same Year much more terrible than the former. It happened in *HEREFORDSHIRE*, in the Beginning of *MAY*. Thunder and Lightening preceded it, and for some Time continued with it, as also a violent Tempest of Wind, that blew both the Lightening and Hail upon some Houses, to their Destruction. Nothing could exceed this but the Hail sent by the Almighty upon the Egyptians; nor can any Words, according to all the Accounts left concerning it, so strongly or so truly described its Terror as those used on the Occasion in Scripture, "Fire mingled with the Hail ran along upon the Ground."

In this terrible Storm not only Fowls and young Animals of all Kinds were killed, but some of larger Growth; and some labouring Persons in the Fields, who could not reach Shelter, suffered the same Fate, their Bodies being black and blue, as if beat to Death with Clubs. Oaks were split; the Branches of many other Trees beat and torn down; and Fields of Rye were, in some Places, cut down as if mowed off with a Scythe. The Hail Stones in this terrible Storm were of no regular Figure: many of them measured fourteen Inches round *, and they seemed Fragments of thick Ice.

The Fields of Rye that suffered thus stood exposed: others in sheltered Places were damaged, but not nearly so much; this may serve as a Caution to the Farmer, and shew the manifold Benefits of Enclosures.

To these Accounts of Hail Storms in our own Country, we shall add two extremely singular in their Kind, vouched upon the most warrantable Authorities, the one of these was in *FLANDERS*, about *LISLE*, in the Year 1686, and the other in *FRANCE*, so long before as in 1510.

In all Observations of Hail Storms with us, they have been no other than Pieces of Ice; but in these there has been something more. The utmost ours have ever been known to contain, has been a little Lump of Snow; but the others have had sulphurous Matter either in their Centre, or in their whole Substance. That at *LISLE* is recorded in the *Philosophical Transactions* †, and had this Singularity, that the Stones were not only vastly large, but appeared dusky in the Centre; and such of them as came down Chimnies into Fires, when the Icy Part was melted, and this brown Substance was exposed to the Fire, burst with a loud Report.

MEZERAY,

* *Philos. Transact.* No. 229.

† Numb. 203.

MEZERAY, in his History of FRANCE, mentions the other with all its Particulars. In this a black Cloud, such as we have described, came over the Face of the Heavens, and darkened the Air like Night; in the midst of People's Terror and Astonishment, the most violent Lightnings and Thunder burst from it, and Hail began to fall. This encreas'd in a most dreadful Manner, and with a strong and suffocating Smell, like burning Brimstone. The Hail Stones this credible Author attests, were more like Pebbles: their Colour blueish, and their Hardness like Flint, till they softened in the Wet. He gives an Account of their Size, which exceeds all others, and which, if less authenticated, could not be believed: he says some of them weighed a Hundred Pounds. We are not to wonder at the Damage done by such a Storm. He says it killed almost all the Cattle, Fowls and Fish in the County; and vast Numbers of the People ¶.

In Calamities like these there can be no Remedy, and there is no Course to follow but Religious Submission. They happen very rarely; and the Damage done by such as are more frequent, is not great.

We have shewn the Husbandman what is in his Power to do against it; and in general, where he has a tender Crop, that stands much exposed, we shall advise him to use the easy Method of sticking up a few Furze Bushes. This will not only be a Defence against Hail, but it will break the Force and Fury of sharp Winds, and keep off those cold Rains, they often carry before them. In all Respects it is a Practice so cheap, so easy, and so certain of doing some good, that we cannot but greatly recommend it.

C H A P. XIII. *Of Snow.*

WE have in the last Chapter considered an Accident that never can be of any thing except Hurt to the Farmer; though according to its Nature and Degree, that Hurt be sometimes greater sometimes less; we are now to treat of an incidental Thing of the same general Nature, which yet always may be, and often is of great Advantage. A deep Snow keeps all sheltered underneath it; and frequently defends a tender Crop from those succeeding Frosts which would otherwise have destroyed it.

We have recommended to the Farmer, on some Occasions, the Gardener's Practice of covering his tender Growths in
Winter

¶ *Mezeray's Hist. de France, Vol. II. p. 339.*

Winter by Haulm, or the dry Stalks of Pease, or the like: the Snow often falls so favourably as to perform this needful Service much better for him than he could have done it for himself; more generally and more universally.

It lies thick upon the young Plants, covering them very perfectly, and defending them from the nipping and destructive Winds; it all that Time mellows the Soil; and when warmer Weather comes to melt it in, nothing sinks down so gently or so gradually. No Water is purer than that of melted Snow, and there is no Method by which Wet gets so thoroughly into the Ground.

Nature seems to have considered greatly the Products of the Earth, in this Formation of Snow. It never can fall but in cold Seasons; which are the Time in which Plants want Shelter: if the Temperature of the Air about the Surface of the Earth be warm, so that there is no Need for it as a Shelter, it dissolves as it falls, and makes the finest watering imaginable.

Snow is in its Nature like Ice, a watery Substance congealed by freezing. When the Air is warmer where it passes, it melts and falls in small Rain.

The usual Shape of the Flakes of Snow, we have mentioned in speaking of the particular Kind of Hail which is stellated, or composed of Rays like a Star. Its most perfect Appearance is in Form of a Star of six Rays, and its Substance clear transparent Ice: but this is not its constant or certain Figure, the Flakes are frequently imperfect, and often less regularly frozen; and all this depends upon the slightest Accidents; the Height from which it falls, and the Degree of Cold in the Air.

Often there are little Points upon the larger Rays; and not unfrequently, the Flakes are altogether shapeless and confused, the Snow having melted in the Air, and froze again.

There have been Instances of coloured Snow falling in certain Places, and it has been considered as foreboding some terrible Calamity. There is an Account of a red or bloody Snow by an ITALIAN Signior SARATTI, preserved in authentick Writings; it is said to have fallen near GENOA: but this is very difficult to be reconciled to what we know of the Course of Nature. We are sensible that Snow is no other than watery Matter, frozen in a particular Manner; and we know also that this Water is raised in Vapour by the Sun's Heat: now we are sensible from what we see in Distillations, and by various Experiments, that Vapours do not rise coloured. The
strongest

strongest Tincture of Cochineal will yield a colourless Water, if distilled; and Red Port Wine yields a colourless Spirit. From these, and many other Considerations, there is Reason to imagine that there has been some Mistake in what is written on these Subjects. We know that what have been called Showers of Blood, have been no more than common Rains, falling in Places where there have been Multitudes of little red insects; and that what are called Showers of Frogs, have only been Rain, and have invited those Creatures from their hiding Places. In the same Manner it is probable that this Snow was not red as it fell, but that it fell upon some red minute Insects. Signior SARATTI says, that when squeezed it yielded a red Liquor, but this may be accounted for the same way; for if the Insects upon which it fell were squeezed among it, their Juices might turn the watery Part of the natural Snow red.

This may serve as an Account of the Nature of Snow, sufficient for the Husbandman's Purposes of Use, or even for his limited Curiosity.

We have observed that it is often advantageous to him, preserving his Crop; but like all other the good Gifts of Nature, it may be hurtful in the Extremes. The same Rain that moistens the Earth, may drown its Products; the same Heat that calls forth the shoots of Plants may, in a greater Degree, parch and destroy them; and in like manner Snow, which shelters his Crop may, in a great fall, smother his Cattle.

He is therefore to act in this Respect, just as in Regard of Hail. He must watch it as it comes, and observe whether it will be in the common Course, or Excessive and Violent. In common Falls of Snow he has nothing to do; but when he sees a vast Quantity on the Ground, and more in the Air, let him drive in his Cattle, and preserve them from the Danger of being overwhelmed and buried in it, as they often are in those Hollows to which they fly for Shelter.

C H A P. XIV. *Of Winds.*

WE have conducted the Husbandman thro' the several accidental Attacks to which he may be subject from Drought and Rain, Hail and Snow. And we are now to consider another Subject relating to the Elements, from which he may, without due Precaution, receive great Harm.

Winds are not of the nature of Snow, a Benefit in the common Course to the Land; they are too frequently hurtful. Their general and great Purpose is to thin, cleanse, and purify

the Air; and as in this Office, so needful to Life, they will often be dangerous to the Husbandman's Crops of various Kinds, and even to his Buildings, he must timely guard against them. Let him not accuse providence of those Damages he may suffer through his own Neglect: God saw winds necessary to keep the Air in due Condition, and he has given Man the Use of Reason to protect himself and what belongs to him from their Fury.

The Sea would putrify notwithstanding all its Salt, if the Winds did not stir and move it about: fresh Waters, when they are large, would sooner suffer the same fate, and Men would be carried off by Pestilences raised from the Vapours of such corrupted Masses: all this is prevented by the timely Ministry of the Winds; and all their Force may be broken with Respect to the Farmer, by a proper Plantation of Trees. We know from what Quarters the most furious Winds blow, and the Defence is to be prepared thickest there. The Husbandman is not to leave this Care till the Storm comes, but to prepare in Time, as one who expects it. Trees are of slow Growth, but when planted properly they are a very certain Defence.

Beside this general Care there may be particular Cautions used, to prevent Damage on extraordinary Occasions; and as Storms may generally be foreseen, like other Changes in the Elements, these should be prepared according to the Necessity. We shall give the Husbandman a general Idea of the Nature of Winds, and of his proper Defence against them; and afterwards add those Signs by which particular Storms may be known to be approaching, and the best Care of the Products of the Ground against them.

Wind is no other than Air in Motion.

We are sensible there is such a Thing as Air, by the Changes we perceive in it, but as it is too fine a Substance to be the Object of our Sight or Touch, we only perceive it in the winds, feeling it by its Motion; whereas, when still, it is not perceptible to any of our Senses, though manifest to our Reason.

We in this Island are subject to great Variations and Changes of Wind, from its different Direction and Degree of Strength; but this is not the Case throughout the whole World. Between the two Tropicks there is a constant and unchangeable Wind, that all the Year blows from East to West. This Sailors well understand, and it is called the general Trade Wind.

About

About the Coasts of the Ocean there are constant and regular Winds also, at certain Times of the Day. These are called Sea Breezes. They blow regularly every Evening from the Sea to the Land, and every Morning from the Land to the Sea.

In many Parts of the World there are also regular periodical Winds. These blow one half of the Year one Way, and the other half of the Year the other, without any Variation.

In our Islands the Winds play about with great Uncertainty; but in general, where there is nothing in particular to disturb them, North Winds are most frequent in a Morning, West at Noon, and South at Night.

The Winds blowing from off the Sea are naturally moist, because they take with them a great Quantity of those Vapours which the Sun constantly exhales from the Surface of that vast Body of Water. These Winds, when they are gentle, bring only a fine pure watery Vapour; but when the Surface of the Ocean is ruffled by them in Storms, they frequently carry off a Part of the absolute Salt Water in small Particles. This, when it is carried on Land, is called the Spray of the Sea. It is often very destructive, and it will be carried many Miles.

This is mentioned as a practical Caution for the Farmer. Many of his Crops will be injured greatly by this Accident, therefore it is his Business to plant by way of Defence, and keep a good Hedge every way to the Seaward.

The North Winds in ENGLAND are cold, and the Southerly Winds warm. A Fall of Snow will have Power to change the Course and Current of our Winds. A warm Southerly Wind shall often be changed into a cold Northerly one, by this or by a Shower of Hail. It would be natural to suppose the Wind changed, and brought the Hail or Snow with it; but Philosophers, who have examined deeply into those Matters, and particularly that great Christian Philosopher Dr. DERHAM, shews it to be otherwise, and that the Snow or Hail absolutely change the Course of the Wind.

The strongest and coldest Winds with us, coming from the North and North East Quarters, it is against these the greatest Caution is to be had in planting.

We have given a large Account of the Nature of Trees, and the Manner of planting them, in a preceding Part of this Work; and to that we refer the Reader for his Choice of the various Kinds. The Sycamore has been happily experienced in the Neighbourhood of the Sea, where it thrives very well; and on exposed Situations the Yew is excellent. It will bear

the Exposure, and delights in the hard dry Soil usually found in those Places ; and though its Growth be slow, its Strength makes Amends. Its Branches also spread excellently for Defence, and are covered with their Leaves all Winter, the Time when Shelter is most wanted, and when Trees in general are least capable of giving it.

After the Yew we may very well name the Elm for this Service ; it roots firmly, and is full of Branches. Its Growth is not slow, and it is nearly universal, for there are few Soils on which it will not thrive.

Hedges are the same Security to Fields that Trees are to the Farmer's Dwelling ; and the more he stands exposed to Winds, the more he is to guard against them, by a due Care in this Article.

In Trees planted for this Purpose of Shelter to a House, there should be a particular method of cutting. The Elm will grow to any Form the Planter pleases, and indeed so will most other Kinds. In this particular Service, their Use, and the Intent of the Plantation, should be considered, as also their own Danger. When the Building is much exposed to Winds, so must the Trees be that are set to shelter it : therefore let them be so cut as to be least liable to Danger. The Head is the Part over which the Wind has most Power, and it is of least Service in sheltering the Dwelling : therefore in these Cases let the Head be small, and the Tree encouraged to shoot out into Branches. The thicker they stand the more is the Shelter, and the less they are in Danger of being torn down.

When the Husbandman has taken Care his Dwelling be thus well defended, let him consider what Part of his Crops will be most exposed to Danger from this Cause, and at what Times ; and then consider of the Ways to foresee and prevent the Mischief.

C H A P. XV. *Of the Signs by which Winds may be foreknown.*

THERE are fewer Prefages and Notices of Wind, than of Rain or Drought ; and they are to be obtained from fewer Objects : but therefore the Husbandman, who wishes to preserve his Crops from all Accidents, should be the more careful in looking after these.

If there be a red dusky Sky in the Morning, and the Sun rises in it white and deadish, the Farmer may expect that Day
violent

violent Gusts of Wind; and generally there will be some Rain with them.

When the Sun is pale at setting, and goes down behind a thick dead-looking Cloud, there commonly follows Rain that Night; and in that Case there is usually a strong and disorderly Wind the next Day.

If the Moon looks dim and misty, and have a large hazy white Circle about her, the next Day will be generally much ruffled by Winds.

When the Moon looks particularly bright, but has about her two or three broken Circles, it is a very strong Sign of a Storm.

When the Stars appear more numerous in the Heavens than usual, and have a particularly lively Lustre, it foretells a Storm. This, as well as the last Observation, regards violent Winds, more than those light Blasts of short Continuance which are often prefaged by the others.

At any Time when there are a number of small black Clouds scattered in the Heavens, and they move to and fro in a disorderly manner, strong and unsettled Gusts of Wind may be expected: these are the Winds that do most Harm of all to many of the Products of Husbandry, and therefore the greatest Regard should be had to this Signal, which gives Notice of their coming, and every Precaution taken in Time against them.

When there is a Rainbow, let the Farmer look carefully upon it; not only with Respect to those Signs of Rain which we have directed him to understand from it, but on this other Occasion of wind also.

When the Rainbow is thicker than ordinary, it is a Sign of Gusts and Blasts. When there is a great deal of Red in it, and that is very fiery, it betokens violent Storms.

The Rainbow is naturally a continued Thing; but sometimes we see it interrupted in its Course, broken, and as it were separated into many Parts: this is always a Signal of Winds. Most of these Signs that are perceived in the Rainbow, foreshew Winds attended with Rain; but that is not constant and certain.

Among Animals fewer Notices of Winds are perceived, than of other Changes in the Elements; yet we are not wholly without Notices from them. About the Sea Coasts in particular, a great deal may be gathered by those Birds which live partly on the Water and partly at Land. The more serene the Air, the farther they keep out at Sea. When they suddenly make to the shore together, there is certainly a hasty

and violent Storm approaching: and when they keep about the shore, and will not venture into open Sea, there will certainly be strong Winds that Day.

There is in some Places a small Bird, which from its Apprehension of Storms they call the *Storm Bird*: this has such certain Knowledge, and such Dread of a Storm, that it never fails to make immediately to the Shore when it is near, on the Approach of Danger; but at open Sea it follows Ships, giving Token to the Sailors of many an unexpected Storm. The Guidances these Creatures receive from Instinct are very surprising, and they were intended by Providence not only to be useful to themselves, but to Mankind in observing them. This little Bird seeks the shore, when in Reach, before the Approach of a Storm: and when too far from Land, it gets behind a vessel for shelter. The Sailors well know they have a Gale to expect when they see it; and the Farmer should have the same timely Caution to prepare for the Defence of his Crops in Danger.

C H A P XVI. *Of the Damages done by Winds to Husbandmen in their Crops.*

PLANTS may receive Injury from Winds at different Periods of their Growth: while young they are so tender, that the Blast will often chill or shrivel them up: when more advanced in Growth, they are more open to its Force by their larger Bulk, and by their standing higher: at this Time they require to be very well fastened in the Earth by their Roots; and the most natural Effect of all others from the Wind is the rocking them about, and loosening of them. This is a Circumstance very little regarded by Husbandmen, tho' very much by Gardeners. In this, as in many of the preceding Instances, there will be the greatest Advantage in bringing the Practice of the Garden into the Field. In new planted Trees the Custom is to tie them up to Stakes: and the Stalks of flowering Plants that rise to any considerable Height, are in the same Manner fastened to Sticks. This is of the greatest Service in both Cases, preserving the Roots quiet and steady in the Earth. We would not have the Farmer follow this Practice literally, by tying up his Corn or other such Growth, but we would have him take the Caution with him of the Danger there is from Winds, though he use another Method of preventing it.

His great Care in most Respects, must be employed in getting

ting strong and thick Fences: in particular Crops there must be particular Cautions, which we shall name.

Of all the Husbandman's Products, there is none which so often receives Damage by Wind as Hops. There are two Seasons at which they are destructive to this Plant: the Blasts of the Spring nipping their Buds, and the Storms of the more advanced Part of Summer shaking them at the Root.

With Respect to the nipping Winds of the Spring, as the Plants are at that Time not much advanced in Height, they are easily enough sheltered by a good high Pale, or a very close Hedge. With regard to the Winds afterward rocking them at the Root, the first Defence is to chuse a sheltered Place for the Ground; or plant some tall Trees that may shelter it: and for all succeeding Time the grand Security of the Plants is the fixing the Poles deeply and firmly in the Ground.

Corn is in the same manner exposed to Damage from Winds, not only when in the Ear by lodging, which principally happens from Winds and Rain together, but while in the first Shoots; for the sharp Winds sometimes destroy in a Manner the whole Produce at this early Period. Experience shews, that it is in open Fields the Crop is most liable to this Mischief; and Reason therefore speaks, that the same Remedy will preserve it in both States: this is a good Enclosure. Different soils require different Kinds of Shrubs for Hedges; and we have in a preceding Part of this Work, given the Farmer his Choice of a vast Variety of Kinds for this needful Purpose; indeed so many, that there is not any possible Disadvantage to which his land can be exposed in this Respect, which has not in Nature its Remedy under this Article, and which we have not endeavoured to lay before him.

When a Plantation of one Kind does not succeed for this Purpose, it will be very proper that he try another; and when he is doubtful of the Kind that may be best, it will always be right to plant two. Most of the Hedge Shrubs that we have recommended, will grow as well two together as singly; and in this Case if one succeed, it will answer the Purpose; and if both, so much the better.

When there is Danger of a common Plantation not succeeding, from the Dryness and Barrenness of the Ground, it is always a good Caution to sow Furze on the side of the Bank. If the Hedge succeed perfectly well, this may be pulled up; but it rarely does so well but that a Bottom of this bushy Plant may be an Advantage. The Winds that

nip the Winter Corn in the Blade, get in more at the Hedge Bottoms than elsewhere; and nothing better than this fence against them.

These are accidents the Farmer is always to be aware of, and therefore the Preparation should be made every where; and every Field will fare the better for it.

CHAP. XVII. *Of the Nature of Blights.*

HAVING laid before the considerate Husbandman such an Explanation of the Effects of Changes in the Air, and of the means of guarding against them, as we hope may serve in general Circumstances, for the Preservation of his Cattle and his several Growths, we come now to consider the particular Accidents to which each Kind are liable: and in the first Place those which affect his Crops.

The first of these, as the most hurtful, is that which is very commonly known, but very little understood, the Blight. We speak of it familiarly, because it is common; but among the many Things that have been conjectured as to its Origin very little said has any Foundation in Fact.

It is a common Error in these Researches, to take those Things for Causes which are only Effects: and nothing so much perplexes the Attempt to Knowledge.

As we have proceeded on other Occasions we shall on this: we shall suppose, that in order to the remedying an Evil, the first Step should be to understand its true Nature and real Cause; and this we shall endeavour to follow in the present Instance.

Among the Variety of Thoughts that have been delivered to the Publick on this Head, the Husbandman, whose laudable and useful Curiosity should lead him to search after the Cause of this Disaster, would not know which to adopt: we shall cursorily name to him the principal of those which have been received at different Times, and point out what Experience joins with Reason to determine.

The Blight is a Disorder that affects Trees and Plants, and is as terrible to the Gardener as the Farmer. It appears in various Forms according to the Degree, affecting sometimes entire Plants, and sometimes only Parts of them. It is the same Disorder which the Vulgar call a Blast.

When it strikes a tender Plant, sometimes the whole perishes; and in some Cases the whole Border of a Garden, or the whole Produce of a Field, is lost at once. At other Times it strikes only a Part, The Leaves of Trees often fall

fall off by this Means, while the rest is unhurt; and sometimes the same happens to Plants of lesser Growth. Sometimes the whole Quantity of the leaves are attack'd, and sometimes only a part of them. The Leaves that are tainted by this Accident, shrivel up and appear scorched; and the Part of the Tree or Plant which is thus struck with it is covered with little Insects.

This Disorder is common to almost all Plants, and to all Parts of the World: we read of Blights wherever we read of Gardening or Husbandry; and for more than two thousand Years Men of Ingenuity have been guessing variously at the Cause.

The GREEKS, who, according to THEOPHRASTUS, called it ERYSE, looked on it as a stroke from Heaven, utterly incurable and incapable of Prevention. The ROMANS called it ROBIGO; and as they deify'd Plagues and Fevers, worshipping every thing they feared, like modern INDIANS, their fanciful Imaginations found a Deity upon this Occasion; they called the new-made God ROBIGUS; and VARRO solemnly invokes his Blessing, that Blights be kept from Trees and Corn.

In general it was attributed to the East Winds; but VIRGIL, whose Husbandry if it were better understood would be more followed, with much more Reason lays the Cause of it to Want of Care and right Culture; and, instead of praying to an imaginary God, advises the Farmer to betake himself to his Labour. It was not Want of Piety in this Poet, that referred him to the use of Labour rather than foolish Rites. In this Case he orders the Farmer to pray for seasonable Showers; and 'tis only the Worship of an imaginary Deity, the Creature of Fear and Folly he derides.

The early notion of attributing Blights to East Winds, has been continued to this Time; and the Curious seeing Insects in such Abundance on the Leaves and Branches that have been struck, suppose these East Winds brought the Eggs of those Insects, and that they are the Cause of the Distemper.

Others have attributed the Cause of Blights to drizzling Showers freezing upon the tender Buds, and that way destroying them: in both these Conjectures there is some Foundation; but they err contemptibly who attribute this Disaster to the Aspect of the Planets. The Accounts however given by those who maintain the other Opinions are of little Consequence, for they agree with only one Part of the Subject. They attempt to explain only the Blights of the Spring, for
both

both the sharp cold Easterly Winds, of which they complain, are most peculiar to that Season; and the freezing of drizzling Rains upon the Buds can happen at no other. But there are Blights, and those terrible ones, at Seasons of the Year very different from these. Corn is often blighted in its full Growth, in a wet Summer. Therefore this Accident may happen without Frosts, or without those very sharp and cold East Winds, which though they frequently attend it, we perceive by this are not the Occasion of the Accident.

In the same Manner those Blights which are called Fire Blasts, and are the most terrible of all to a Hop Ground, happen in JULY oftener than at any other Time.

C H A P. XVIII. *Of the antient and Modern Observations of Blights.*

THIS shews that the Cause is not what these Persons have thought, and therefore that the Farmer must seek farther than their Advice for a Remedy. The same Accident that happens in this manner in our Hop Plantations, us'd to damage the Vineyards of old ITALY. The authors on Country Affairs, name it with great Marks of Concern; they distinguish it by the Name of Carbunculus, but this we find both by the Context and their own Account of the Disaster, was the same with the Robigo or Blight. Storms, PLINY says, were less terrible to the Vintage than this Blast, for they affected only particular Places; this cut off whole Plantations.

The Time of this terrible damage happening to the Vineyards, appears to have been the very same with that in our Hop Grounds, and the Circumstances also the same. Ours happens towards the end of JULY, and theirs comes on toward the ripening of their Grapes. What we read particularly of it is, that it generally followed violent sudden, and short Showers; which happened about Noon in that hot Season, and were followed by clear Sunshine. They add, that it was sometimes partial, sometimes universal: that when it was partial, 'twas the Middle of all the Vineyards that suffered, and when it extended through the whole Ground, it always was plainly perceived to have begun in the inner Parts, and there to have been most severe.

This is the Account of a violent Blight in the Heat of Summer, in the Vineyards of ITALY, two thousand Years ago; and if we compare with this the exact and judicious Observations of Doctor HALES, made upon our ENGLISH Summer

Summer Blights in Hop grounds, we shall see the antient * and the modern † very happily explain and illustrate one another: and the Farmer will thus, better than any other Way, be led toward the Discovery of the real Cause of the Disaster.

No Plantation can so much resemble that of the antient Vineyard, as our modern KENTISH Hop Grounds: the Season for their Carbunculus is the same with that of our Fire Blasts, and the Circumstances attending both perfectly correspond: The Observations of our ENGLISH Philosopher are, that when there has been Rain, and a hot Gleam of Sunshine immediately followed it, the Fire Blast has happened; that it has attack'd the Plants in the Middle of the Hop Ground particularly, scorching them all up in a Manner from one End to the other.

The damage in this instance happened a little before Noon; and the Blight or Fire Blast ran in a Line at right Angels with the sun Beams at that Time of the Day. There was little Wind, and that which did blow was in the Course of the Blight, or according to its Line. Those who would enquire into the Nature and Cause of these Disorders in Plants, are extremely obliged to the Author of these punctual Observations; for comparing them with what we find in these old Authors, we find that the Nature of Blights is a fixed and certain Thing; that they appear in the same Manner, and observe the same Course, and that they plainly arise from the same Cause in the most remote Parts of the World.

This shews their Origin to be always, and every-where from the same Principle; and it is not impossible upon so much Observation, to make a probable Conjecture what it is, and thence to attempt a regular Method of preventing its Damage or defending Plants and Trees from it.

This we shall endeavour to trace and direct in the most punctual manner.

C H A P. XIX. *Of the real Cause and Origin of Blights.*

BEFORE we enter on this Enquiry into the Cause of Blights, we must warn the Husbandman that he distinctly understand what is signified by that Name. We have mentioned the Circumstances and Manner of Appearance of Blights, and these, according to those Circumstances, we are about to account for; but we must remind him that many,
for

* *Columella de Rust.* † *Hales's vegetable Statics.*

for want of Consideration, confound together under this Name almost all the Disorders to which Plants and Trees are liable.

A Blight, distinctly and properly so called, is a Damage suddenly happening to Trees and Plants, which appears in the Manner of burning, scorching, or shrivelling up the Leaves, and often withering the young Branches. This we have shewn happens sometimes in Spring, sometimes in Summer; and this is what is properly called by the present Name: if any call a Growth of whatever Kind blighted, because it is starved, or distinguish by that Name the Damage done by Frosts upon too early Blossoms, they are to be told these Disorders of Plants and Trees come under the Heads of Accidents from Frost, and Accidents from want of Nourishment, and will be treated of distinctly as such. Therefore what is here mentioned under the Article Blight is a distinct Thing, and it is of the Cause of that alone we treat in this Chapter.

This Blight sometimes affects a whole Plantation, or at least the whole internal Part of it, and sometimes only here and there a single Plant. In the first Case, which is of the greatest Consequence, it depends in some Measure on the Nature of the Plantation, and therefore may be remedied or prevented; in the other it arises from Causes quite out of our Power, and we cannot do any thing to obviate the Mischief; but it is of the less Importance, because it affects but a small Part of the Crop.

The Blight which we have described as affecting the inner Parts of Hop Plantations, and which the Antients mention as destroying their Vines, will also destroy whole Crops of various Kinds in the Field: we shall see the Cause of this, and therefore may reasonably propose a Remedy.

As it affects the inner Parts of Plantations first and most, and as it follows Rain, there is all possible Reason to believe it is the Effect of a Vapour raised in Abundance in those Places, and stagnating there; on which the Sunshine operates to the Destruction of the Plants.

If this shall appear upon farther Enquiry to be the true Cause of Blights, the Remedy will follow plainly. It consists in nothing more than keeping the Plantations clearer; setting the several Plants at greater Distances, and giving the Air free way between them.

If the Outsides of the Hop Plantation escape, while the inner Parts are destroyed, what is the cause of this, but that the free Air coming to the Outsides dispels and scatters that Vapour, which stagnates in the close Parts of the Ground till the Sun, by its Means destroys the Plants? This plainly

is the Case, and there is no other, nor can Reason propose, or will Experience vouch for any other Course. Therefore the Remedy will be to make the Plantations more open and free to the purifying Air. Moderation is to be used in this.

We know that Hop Grounds must be sheltered from high Winds, or all will be destroyed; but at the same Time that they are sheltered from the worst Quarters, they may be left open on some others; though they are to be defended, they are not to be smothered up. This is the Effect of over Caution in weak Minds, but nothing is more dangerous. Let the Farmer in this Case, and all others, take Care that he avoid the Common Mistake of running into one Fault in shunning another; it is in this Case, as in many others, running into a worse.

When the Ground is so disposed that the Air can have free Ingress to all Parts of it, there will be nothing to fear from the Fire Blasts of Summer. What is observed of the Hop Ground in this Case, holds good of all other Plantations: I only name that here because this is the most particular, and in which it is most plainly shewn.

The Way to give the Air this free Ingress and Passage, is to place the Hills at greater Distances than usual. We have laid down the best Distance in general Instances treating on Hops; but let the Farmer observe, that in Cases where the whole Ground is more enclosed, the Passages within must be opener.

Too close Planting is most of all destructive to Hops, by bringing in these Blights, and Fire Blasts, because the Hop is so tall and large a Plant: but in all others it more or less affects them in this Case, according to their Height and Manner of Growth, and according to the Exposure of their Situation.

The Summer Blights of Corn, and all other Crops, are owing to this same Cause, the Plants standing too close; in this Case the hot Sunshine following large Showers, blights whole Fields.

The Caution to be given the Farmer is, that he Plant all his Crops thinner than the usual Custom; and this we have recommended to him already, and have shewn him that his Produce will not be less, but greater for it. As this must be his general Caution, so in particular he must observe, that where the Place is most close, the Distance of the Plants must be the greatest.

This Caution recommends the Horsehoeing Husbandry, as a Cure for Blights, and indeed there is none so certain or so great.

great. Whoever saw a Field of any Crop treated in this Manner, blighted: 'tis not only the clearing the Ground between the Plants, that gives them this Advantage in the Horsehoeing Husbandry, but the affording them more Nourishment, that helps greatly. Starving and blighting are two distinct Things; but a starved Plant will be sooner blighted than one that is strong and flourishing.

The Husbandmen of old time were aware of this: for VIRGIL prescribes but one Remedy, which is Labour. Indeed this is one great Reason for our recommending the new Practice of Planting at Distances, and breaking the Ground between for almost all Crops. The Plants are by this supplied with abundant Nourishment; no Weeds rise to starve them; and they cannot starve one another; and the Seasons and Elements are admitted to their Good, but can do them no Harm. The Showers are imbibed by this free and broken Earth between them, better than any other Way, and what is evaporated has the open Air to expatiate in, and goes off blended with it.

If we would be assured of the Truth of what is here advanced, respecting the Cause of Blights, our Eyes may be made Evidences. Let any Man look into a Hop Ground on a Sunshining Day, after great Showers; in the Middle of the Ground, and every where when the Plants stand thick and close, he will perceive these Vapours rising in Abundance, and hanging with a quivering Motion among them like a light Smoak, where there is no Wind: if he look at the rest of the Plantation, through them it appears dim and hazy; and if he looks through them at a Church or House, or other distant Object, his Eyes will ache by Reason of the confused Look and quivering Motion. Let him then examine whether there be these Vapours about the Outsides of the Ground, and he will find there are not. All is there clear because the Access of the Air is free, and they blend among it as they rise. The Blights and Fire Blasts follow in the Middle and close Parts of the Ground, and not on the Edges or among the outside Plants. They come where these Vapours have been seen hanging, and no where else. There is this to cause them, and there is nothing else. Therefore in all Reason we must conclude these Vapours are the Cause, and no other.

We see the Occasion, and the Remedy is easy. Let the Air have free Egress as well as Ingress among all Parts of the Crop, whether it be of a taller or lower Kind; and no Blights will be found. This is best obtained by following the Practice

Practice of the Horsehoeing Husbandry, but any other Method of keeping the Plants at a Distance, and allowing the Air free Passage between them, will answer the Purpose.

Those particular Blights which fall upon only a single Plant in a Field, or any Part of a Plant or Tree, arise plainly from the same Cause with these general and terrible ones we have described already. Their Origin is an undissipated Vapour. If it be asked, whether little Parcels of such Vapours ever hang about in the Air, those who are accustomed to the Use of Telescopes, can tell us that they do. 'Tis not easy to distinguish such floating little Parcels of Vapour by the naked Eye, but when those curious Persons use these Glasses, they often see them come across their View and disturb the Sight.

One thing that Confirms the Opinion of these particular and partial Blights happening from such little Parcels of Vapours is, that they generally come when there is little or no Wind. A greater Wind would break and disperse them.

This seems to be the true Account of their Nature and Origin, they, like all other real Blights, are owing to Vapours hanging in the Air, through which the Sun's Rays scorch the Plants, and this is not wonderful to those who understand what must be their Power on such Occasions.

C H A P. XX. *Of Damages by Easterly Winds.*

WE have shewn what is the real Blight, and what the proper method of guarding against it, and preventing its great Damage; we are here to treat of all the Accidents to which Crops are liable, and shall therefore begin with such as are called by this Name.

There are Spring Blights of the same Nature and the same Origin with those of Summer, the Effect of scorching Vapours kept stagnating in the Air, and heated by the Sun. These are to be prevented in the same Manner as the others, therefore nothing more need be said of them here: but beside these there are two Kinds of Damage done by Easterly Winds, and by late Frosts, which, though called by this Name, are in themselves altogether distinct in Nature; these we shall consider separately in this Place. Easterly Winds in Spring often nip and destroy the tender Shoots of Plants of all Kinds, and they do this Mischief by stopping the Current of the juices in these young and tender Parts.

The Farmer sees this, and so does the Gardener, for both
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are equally affected by it, but neither of them understand or indeed look into the Cause.

When the Juices are thus stoppt they swell the young Fibres, and the several Parts of the Leaves burst and wither. The Juices gush out in this Case, and they become the Food of numerous little Insects. Wherever there is Food for these Creatures, Nature yields them in great Number to devour it; and consequently in this Case there are presently seen Abundance of them on the young decaying Shoots.

These Insects are always found upon these damaged Branches, and by a very natural Error they are supposed to occasion the Mischief. The Farmer imagines the East Wind brought their Eggs, and he strews Tobacco Dust over the Crop, or burns wet straw on the Side of the Ground, from whence the Wind will carry the Smoak among the Creatures. In this he aims to destroy the Insects, as if that would recover his Crop: but he errs from the Beginning. The first Step should have been to guard against the Mischief, and when that has been omitted every following Care is vain.

The East Wind does not bring these Insects, nor are they the Occasion of the Mischief: they hatch where there is Food, the whole Air being full of the Eggs of such Creatures, and they feed upon the Juices which these blasting Winds have stopped in their Current. These harmless Creatures do not eat the Leaves, or tear them; they find them burst, and they feed upon what runs from their Wounds.

The Farmer may know when there is Danger from these Winds, their Effect is by absolute drying and shrivelling up the Parts, and the Destruction they occasion is solely brought on that Way. We know the Effect a drying Wind will have upon any tender Leaf exposed to it, when taken from the Tree or Plant: these young shoots are thus tender while they are upon the Branches, and the Effect is the same. The wind shrivels them up. When there are moderate Showers now and then, or when there are but good Morning Dews, these Eastern Blasts do no Harm. The only Seasons when they are destructive is such as are perfectly dry. Therefore the Farmer knows when he is to fear the Damage.

When he sees a dry Spring, and the Wind set in Easterly, let him go over his Fields and his Orchard, and see what Parts of his Crops are forwardest, for they will be in most Danger. Let him not stay for the Appearance of Insects, but prevent if possible the Effect of the Blasts: and this is to be done by proper Defence and Shelter. The Use of thick Furze Bushes may serve excellently for this Purpose; and

and they should be stuck in the Ground in close Rows, not only on the Side of the Field where this destructive Wind is likely to come in, but in different Places, at some Distance in the same Direction.

We see the Cause here is so different from that of a common Blight, that the Remedy is to be just of the opposite Kind: in that Case the Wind is to be admitted among the Plants by all Means; because it will carry off those Vapours which are the Occasion of the Mischief: and in this it is to be kept off as much as possible, because it is itself the Cause of the Injury.

This may serve as an Instance of the Necessity there is of the Farmer's understanding the Causes and Nature of all those Accidents that may befall his Crops. We see in the present Case, that by the improper confounding of two Things of contrary Cause and Nature, under the same Name of Blight, he might be led to practise that for a Remedy, which would be the very Cause of promoting and extending the Damage.

We have now instructed the Farmer to distinguish the Cause from the Effect; and having taken the proper Precautions in this Respect, we may lead him to consider the other. When he has sheltered a Crop that may be in Danger on this Occasion, let him from time to time examine whether his Precaution have proved effectual. If in any Place he sees his Plants hurt while they are free from Damage in others, let him thicken the Shelter against that Place, and then, having provided against the extending of the Damage from the original Cause, let him take care that it be not encreased by its natural Consequences.

We have shewn that the Insects which appear on Plants nipped by easterly Winds, are not the Cause of that shrivelling and withering of their Parts, but they may very much contribute to the spreading of the Disorder. Wherever they are first hatched they breed extremely fast, and that in a very particular Manner. They do not wait the ordinary Method of Copulation of both Sexes, but they are all Breeders: and the young produced from them are full of others, which they discharge from time to time, and so on at least for several Generations. This may appear strange to many, and it is one of those wonderful Processes of Nature, in which for particular Purposes she departs from her usual Tract and Course. Mr. DE REAUMUR, of the Royal Academy of Sciences at PARIS, the RAY or SLOANE of FRANCE, had the Curiosity first to discover and trace this wonderful Procedure, and many

have since observed it: any one may, for the Creatures are common enough; and if one of them, any one at random, be put into a little Box and kept alive, it will produce its Young; and any one of these Young taken out as soon as born, and kept in a separate Box, will do the same, and its Young after it. The Experiment has been continued through five Generations. This may shew us how abundantly the Insects on a nipp'd and injured Plant will encrease, and they will spread the Mischief by wounding other Parts of it. An accidental Injury brings them to the Plant, but they are capable of doing a great deal themselves. Having fed upon the Juices that issue out of the burst Vessels of the Leaves, they will pierce them in other Parts in search of more: and thus the Plant will be full of Wounds. Out of all these the Juices will flow, and they will thicken and grow clammy in the Air: and this being the proper Food of these Creatures, not only their own numerous Brood will from time to time encrease the Mischief, but this Quantity of new Food will occasion the repeated hatching of more and more of the same Kind, brought in the Egg or Embrio as the first were in the Air.

For these Reasons, when the Husbandman has found what Part of his Crop has suffered by the dry East Winds, and has guarded against their farther Damage by improving the Shelter in that Place, let him set to work to prevent the spreading of the Mischief already done, by destroying the insects, and by spoiling their natural Food.

This is not to be done by sprinkling Tobacco Dust or any such Method; for that will only damage such of the Juices as are already out, and the Consequence will be, that the Creatures will neglect those Parcels and wound the Plant in new Places for more. This shews that the natural Consequence of using this Dust by way of Remedy, is the encreasing the Disorder; and so I have found it by Experience.

We have observed that dry Winds occasion this Mischief, and it is dry Weather that supports the Insects which appear upon the hurt Plants. Of all the Methods that can be devised for their Destruction, none will be found so effectual as the drowning of them. The Plants should be well watered every Day with a watering Pot, and this repeated constantly till natural Rains fall. It will, if not utterly and entirely remedy this Evil, yet certainly abate, perhaps totally stop its Progress.

We see constantly that Rains destroy these Creatures, and

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restore such Parts of the Plants, as are not utterly destroyed, to their former Vigour.

Nothing can be so reasonable, so prudent, or so proper, as to imitate this Relief of Nature by Art, and nothing will have so good Effect. This watering of the Plants will not only destroy many of the Insects, but it will wash off the sweet Juice that hung on the Leaves, and would have brought more: and at the same Time that it is answering these excellent Purposes, it will be obviating the very Cause of any farther Injury from these Winds, by remedying the Dryness of the Season.

The Plants suffer in their shoots by these Winds, because there is no Moisture to prevent their shriveling up by them: and by this Means that Moisture, so needful to the Ground, is given by the Hand of the Husbandman, though it be withheld in the Clouds. The watering them all over answers this Purpose extreamly for the Time when it is doing; but the good Effect is not limited to so short a Continuance. The Vapours rising from the wetted Ground soften the Air, and the young Shoots and Leaves are kept in such a Condition of Moisture, as to resist the Effect of parching Winds all the succeeding Day. Let our Farmer on this as all other Occasions be upon his Guard, that he do not, by an ill managed Application of the Remedy, hurt more than the disease would have done. Let him remember, that watering in an Evening, when the Nights may be frosty, as they frequently are at this Season, may be the entire Destruction of his Crop. He must for this Reason be sure to water and wash his Plants only in a Morning, and he need not fear damaging them then; for the Dryness of the Season will make this useful in every Respect. The whole Day coming after the watering, some will be taken in by the Plant, some evaporated; and the Quantity that remains in the Ground at Evening, will not be enough to do the Plants any Damage by the Night's Frost.

Thus many good Purposes will be answered at once by the Method we have directed; and it will not be impossible, but that the damaged Part, thus managed, may prove the very best Piece of the Ground.

C H A P. XXI. *Of Damages by late Frosts.*

WE have shewn, that one of the Accidents which happen in early Spring to the Crops of the Field and Garden, and which is improperly called a Blight, may be remedied by due Care: we come here to treat of another Damage of the

same Season, called in a confused Manner by the same Name, but altogether different in Nature. The unexperienced Eye is pleased to see the early Appearances of Spring in the Garden and in the Field; but the more judicious tremble for both. In our uncertain Climate, nothing is more subject to Destruction than an early Shoot: we have Frosts frequently very late in the Spring, and these nip and destroy all such early Shoots. It is therefore our Happiness, when the Seasons are more regularly separated from one another; when the Winter takes its Time, and the Spring begins late enough to continue uninterrupted.

When it has happened that a Crop of tenderer Kinds has shot briskly from some early soft Weather, the severe Morning that follows nips the tender Leaves and they fall off, and not unfrequently the young Shoots with them: this is a Stoppage in the Growth that retards it vastly, and that is very difficultly recovered.

We see the Occasion of this Damage, and the Consequences; but nothing is so difficult as to propose a Remedy for it.

The Gardeners, whose Blossoms and young set Fruit are frequently injured by this Accident, have Recourse to a Method of Prevention which encreases the Disease. They cover up the Trees with Mats, and thus indeed defend them from the present Frosts; but they make the Shoots by this Means so weak, that they are sure to be destroyed by the next. If the Farmer could any Way imitate this Practice, it would be by scattering Straw or Haulm over some tender young Crop: but in this Case, without the utmost Care, more Damage would be done than Good. If he ever should be tempted to follow this Practice, there is but one Way of doing it safely, and that is attended with a great deal of Trouble: he must have this Covering of his Plants scattered slightly on every Night, and removed every Morning, raking it together in separate Heaps, from whence it must be thrown upon the Crop again in the Evening. If it were suffered to lie on all the Day, the Plants would be drawn up so weak, that, like the Shoots of the Trees in the Garden, they would be sure to be destroyed by the next Frosts.

Though we can fence off Winds, and wash away Insects, we cannot command the Temperature of the Air; nor is there any Way of defending our young Grow hs from it, other than what is just named: but we have on all Occasions warned our Husbandman to be wise betimes; and in this Case more than in most others it is necessary.

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Let him before he commits his Crop of whatever Kind to the Ground, consider the Dangers to which it will be exposed; the Methods that he shall have in his Power for guarding against them, and the Chance of the Advantage from early Growth, and of their Destruction or Escape. 'Tis thus he will be able to judge, and no otherwise, of what is the proper Method of acting.

Some of his Crops are required early, and to others it is of little Advantage: this we have before explained under the particular Articles, and let him well consider it in this Case. The earlier he sows, the earlier his Crop will rise; and the sooner in Spring it is up, the more it will be exposed to this Danger. Let him run the Hazard; for none but such as will, have a proportioned Benefit from their Forwardness: and with respect even of these, let him be moderate; for it is not being out of the Ground at an extremely early Period that is so advantageous. The great Benefit arises from contriving the Crops, that they will be in a Condition of Growth upon the earliest Setting in of proper Weather. This he can only know by Guess; but having formed the best Conjecture he can, let him sow accordingly; and if when the Crop is up the Frosts threaten, let him defend it in the Manner we have just mentioned.

CHAP. XXII. *Of Damages from Weakness and Starving.*

WE have observed that among the many Disorders of Plants, comprehended under the Article of Blights, in the common Way of speaking, one was that of Weakness in the Growth from some Accident, which starved it.

The very same Effect which we see produced by a real Blight, we sometimes also find attending this Accident; and the Account for it is very easy. In that Case a thick Vapour, by means of a strong sun, has shrivelled the Leaves, and scorched the tender Stalks of a Plant: and in this a like Accident happens from the Want of Nourishment. Those Parts nearest the root are best supplied with Juices, and therefore they are full, flourishing, and fine; while such as are farthest off from that source of Nourishment, wither when there is not enough to feed all alike.

'Tis the same in this Case as in the Human Body: when the Heart cannot drive the Blood through all Parts, those farthest from it suffer first, the Hands and Feet have the Juices first stagnate in them; and in the same Course in the Plant,

the Tips of the Branches, and those other Parts most remote from the root are first affected in the Case of starving.

We name this for the Farmer's strict Observation; because it will let him into the nature of the Disorder, without which it is impossible for him to find the proper Remedy. When he examines what is called a blighted Crop, let him look carefully to this: no Matter that Insects crowd, and Leaves curl up, and that all the signs of real blighting appear: if he perceives all the Tips of the Stalks and Branches affected, and few other Parts, he may be sure the Disorder is no Blight or Blast, but a stagnation of the juices in the Tips or Extremities of the Plant, for want of a fresh supply to force them on in their natural Course.

Although there is not a Circulation of the Juices in Plants, as some have supposed, there is a continual Motion forward to the Ends of the Branches, where a great deal is discharged by Perspiration: this we have shewn in a former Part of the Work. This Motion of the Juices is altogether necessary to the healthful State of the Plant, and whenever it ceases, the Part in which it is kept becomes diseased.

Knowing thus much of the Oeconomy of Nature, in the Management of Plants, we shall not find it strange that this Stagnation of their Juices happens from starving. When the whole is in a flourishing State, the Root takes in a great deal of Moisture, which it sends upward in a constant Motion, and this drives on the rest. When there is not enough of this received, and the Plant is not vigorous enough to throw it upwards, this Motion grows faint. The Juices stagnate and stand still in the extream Branches: and where they stagnate they always burst the Vessels by the Sun's Heat, and sweat out.

This is the Signal of Nature to all the Insect Tribe together. Their Eggs or Embrios are floating every where in the Air; and wherever there is Food for them they stick and hatch into Life, and they breed abundantly. These come therefore wherever there are corrupted Juices in plants; and their Appearance is as natural from starving as from scorching of the Plants: from this it has happened that both Accidents are called by the same name by the Vulgar: but let the Husbandman learn the Difference, because they require altogether distinct Remedies.

When the Cause is seen to be a Defect of Nourishment, and not a scorching Vapour, the Remedy is natural, but it is not equally easy to be applied in all Cases. The Farmer will here see another Instance of the Excellence of the Horsehoeing Husbandry.

bandry. This Sort of Blight, as it is called, may always be remedied presently in that Method, because it is in our Power at any Time to give the Plants a due Supply.

What cannot be done so well in the common Method, yet must be attempted in the best Manner in the Farmer's Power, upon the same Principle.

It will rarely happen that a Crop raised in the new Husbandry is subject to this Disorder, but when it is, the Remedy is to send in the Hoe Plow, and tear up the Ground to a good Depth between the Rows; this giving the Plant abundant new Nourishment, as we have shewn, the Disease is remedied at once. The whole Crop shoots strongly; and the little Insects, whose Food depends upon the starved Condition of the Plant, drop and die off of themselves.

This is the short End of a starved Condition, from Neglect in the Horsehoeing Husbandry; for be the Soil what it will, starving can only be the Result of Neglect in that Method. The Earth being broken small is ready to receive the Dews and Rains, which will wash its new-brought Nourishment into the Roots; and the Roots will be sent out in vast Multitudes to receive it: for the consequence of this plowing near them is, that their Roots are all cut off at the Ends, as those of a Plant new set by a Gardener, and they shoot out innumerable others in Consequence. This we have shewn before to be the Fact, in numerous Instances, and remind the Farmer of it in this Place, that he may understand how perfect a Remedy is this Way in his Power.

When a Crop of some of the large growing Plants, for they are most subject to this Accident, are thus endangered by starving in the common Course of Husbandry, the Hand Hoe is all that can give them Assistance, and it must be immediately employed. There is in this Case no clear Interval for cutting deep into the ground, but what Space there is between Plant and Plant, must be clipp'd as well as it can at the Edges and Surface. This will have some Effect; and indeed, if wisely and boldly employed, may have more than the Farmer will at first expect.

What has assisted to the starving of the Crop in this Case is, probably either a large Growth of Weeds among the Plants, or their standing too close to one another.

In the first case this Hand Hoeing is a Remedy, because all the Weeds of what Kind soever, will be cut up by it; at the same Time that it breaks the Ground between the Plants, and cuts some of their superficial Roots. But let the Farmer not stop here; in this Case of starving, most probably the Plants

standing too close has been the Occasion of it; or if not, no Way is so sure to recover one half, as to cut up the other. This will give the Hoers leave to work more boldly, and give more Scope to their Strokes, that they can cut deeper: the Earth will be more broken, and the Air, Dews, and Rains better let in: the Wind will be able to blow fresh between the Plants also, and every thing will thus tend to their Recovery.

Let not the Husbandman grudge the Part of his Crop that is to be destroyed. DARIUS did well to offer half his Kingdom; and it would have been happy for him if ALEXANDER would have accepted it, and left him the Remainder. In this Case the Question is not whether the Farmer shall have half or all; but whether he shall have half or nothing. I have thus seen a Field of Coleseed saved to the Owner in NORTHAMPTONSHIRE, when every body gave it up for lost; and I really believe it yielded him more Seed from the half, or less than half the Plants that remained, than it would have done from the whole, if they had gone on ever so well in his crowded method of Planting them. In this Case, as in some others that I have seen, I am strongly of Opinion, that a great Part of the Mischief happened from the sowing so thick, that the Plants choaked and starved one another: and it is certain, that there is no Remedy like thinning them to a proper Distance. When the Husbandman shall see the young Plantation, we have directed for his Orchard decaying in the same Way, let him pursue the same Method of Relief, as we have directed in Case of Crops, by the Horse-hoeing Method.

In the common Plantations he must dig round the Trees with a Spade, breaking the Earth well, and throwing it in carefully and lightly: but in our Method of Planting distant for cultivating the Land between, let him bring in the Plough, let him bear very near the Roots of every Tree that is in this sickly Way, press the Plough deep, and make the Share, as VIRGIL says, shine from the Furrow. This will give new Nourishment and new Life to the Plantation; and thus in every other Article, where the Mischief plainly happens from a starv'd Condition, let him give the Crop a more abundant Nourishment, and make it shoot strongly. This done, he need not trouble himself about the Insects: for, as the Doctors say, when the Cause is taken away, the Effect ceases.

C H A P. XXIII. *Of the Nature of Mildew.*

THE Farmers are imposed on in nothing more than the Names, Nature, and Causes of the several Accidents to which their Crops are liable : and while they are not rightly informed in this Respect, they can never attempt any thing rational for their Cure. They hear certain Words continually repeated as the Names of various Accidents ; but those who speak, and those who write, confound them one with another : we shall shew them distinctly what each Name means ; what each Disorder is ; and what Remedies are in their Power. Nothing is more needful to the Husbandman than this Knowledge, and nothing is more wanting.

Some have asserted, that Blights and Mildew are the same Thing ; but these err, for they neither are the same in their Nature or Consequences ; neither are the same Remedies or Precautions Proper ; therefore this is a very hurtful Error.

Others differing from these two widely, in the Vehemence of exposing their Error, fall into another of as bad Consequence. They say they are not at all alike in Cause, or in their Nature. This is palpably a great Mistake ; for they are alike in some Respects, though they are not the same.

We shall endeavour to set the Husbandman right in this important Article ; and in order to it shall refer him to what he sees in Nature, not what he may have hitherto read in Books. Indeed the first step toward his arriving at the Truth, must be his understanding the Errors which have been delivered to him as the real Account of the Accident.

Nothing can set the common Class of Writers on this Subject in a meaner Light, than the observing in the present Instance, how they have transcribed Mistakes, and copied unmeaning Words from one another.

Old MARKHAM fetches Mildews from the Heavens. He attributes them to baleful Influences, and malignant Vapours of the Sky ; which striking to the Earth, alter its sweet and pleasant Nourishment, and change it into Bitterness and Rotteness ; whereby the Corn is slain outright, or rendered withered, lean, and all unkindly*.

This Doctrine passed for current, till the succeeding Days of WORLIDGE, who, searching nearer Home for the Disorders of his Crops, attributes this to a fat and moist Exhalation from the Flowers, and other Parts of the Vegetables, condensed

* Book 2. p. 81.

denfied by Cold in the upper Region of the Air, and thence falling upon the Plants again*.

The Language of MARKHAM is florid in his uncouth Way; and that of WORLIDGE is familiar enough. In general, the farther People in these Studies deviate from plain Language, the farther they depart from Utility: these are Writings meant to inform the Mind, not to please the Imagination. The Fields may laugh and sing in Prophecy, and VIRGIL may have Beauty in his *intereunt fegetes* †, for his Georgicks are Poetry; but these are not the Expressions which should be used in laying down the practical Rules to the industrious Husbandman, and explaining their Uses.

WORLIDGE has delivered his plain, original Conjecture, and many have adopted it; for MARKHAM's was the Error of his particular Age, and could not be well received in any other.

Industrious MORTIMER has copied honest WORLIDGE, not his Thought only, but his Words §; not so much as attempting to reason or improve upon him. WORLIDGE, though not exactly right himself, yet laid a Foundation, on which a little plain Sense and good Observation would have arrived at the whole Truth.

From MORTIMER, CHOMEL translating this imperfect Account, ‡ conferr'd a lasting Obligation (such were the Words) upon his Country: and from CHOMEL 'twas englished back again, under the Auspices of BRADLEY††.

Thus we see how many write, and how few think: how Error goes the Round of different Nations: that which was old in BRITAIN, after it had appeared new in FRANCE, grew new again at home, in the Translation of that first Translation. From these, unaltered, unimproved, and unamended the Account made its Way into the Compilations of CHAMBERS** and of MILLER††; and from them into the patched Productions of still later Writers below Contempt.

This is what the Farmer meets with, if he have Curiosity to read for Information. This was the State of useful Knowledge, in a Country famed for its Improvements, during almost a Century. The first rational Advance he is to make toward Truth, is, by seeing the Errors and the Imperfections of these Accounts; and the next is, to read it in the Book of Nature.

C H A P.

* *Syst. Agriculturae*, p. 209. † *Book 1. § Art of Husbandry*, b. 7. p. 303. ‡ *Diſt. Oeconomic.* †† *The same Work translated into English, Article Mildew.* ** *Encyclopædia.* †† *Gardener's Diſt. Article Mildew.*

C H A P. XXIV. *Of the real Cause of Mildew.*

WE have shewn the Husbandman that the first Accounts of Mildew were erroneous, and that the latter have been all imperfect. It is not true that Mildews are sent down from the Clouds; nor can they ever be understood by those who join the Exhalations of the Earth and those of Plants together for their Cause. Let the Farmer look out into his Fields, and when he sees a settled Mildew on his Crop, he will find Insects, just as in the Case of Blights, feeding upon a Honey-like Moisture lodged on the Plants; and where it is but beginning, he will find this moisture, tho' less thick, yet sweet and clammy, covering the young Shoots, tho' the Insects have not found it.

This shews him, that the Cause of Mildew is the hanging of a thick sweet Moisture on the Plants; here is his first Step to the true Knowledge of the Disorder: the next is to enquire whence this Liquor comes, not from the Clouds or Skies, according to MARKHAM; for only pure and simple water can get thither, nor did any thing else ever descend from thence: neither can such a Juice rise from the Earth, as WORLIDGE fancies, for there is none such there. Waters may be impregnated with Minerals, and their Virtues may rise with them; but there can be nothing of the Honey-kind raised from thence. The Earth can send up nothing but what it has, let the Sun's Power be what it will; and it has not in it the sweet Juice which occasions this Accident.

To understand this rightly, let the Husbandman perfectly inform himself what this sweet Liquor is; it is but one Thing in whatsoever form it appears. Whether it be solid or liquid it is the same Substance; and whether we see it in the Form of Honey from the Bees Stores, of Manna from the Ash Trees, or of Sugar from the Reed.

We see there is such a Substance in Nature, and but one such; and, to understand this Disorder which it causes, let us enquire whence it comes. It is not dropp'd down from the Heavens, nor drawn up by the Sun from the Ground; this we have shewn: there remains but one way it should come, and therefore that must be the true source of it. Since it is not originally in the Earth or Air, it must be produced in the Bodies of Plants; and that is its true Origin.

The Juices of the Earth are received into the Roots of Plants; and these, as we have shewn in a preceding Part of this Work,

Work, are only Water and the fine Part of Mould, and of Manure : Water alone will, to many Plants, answer the Purpose.

Of whatever Kind they be in any particular Instance, whether Water alone, or Water and pure Earth ; or, lastly, Water, Earth, and the fine Part of Manure, they have nothing of this sweet Taste, nor of the Honey or Sugar Nature. They are received into the Vessels of the Plant, and there, by an Operation to be admired, not to be understood, they are converted partly into the solid Parts of the Herb, and partly into these sweet Juices.

We know this is done, because tasting these Substances first we find they are not of this Nature ; and examining the Juice of the Plant afterwards, we find that is such ; but we cannot enter into the Secrets of Nature so far as to find how it is done. Let the Farmer, more humble than the Philosopher, be sensible of this, and know where to stop his Enquiries. It is enough for all useful Purposes, that he knows this Juice is there, no Matter how it comes. This sweet Juice of Plants is extracted by the Bees from their Flowers, in its own proper Form, and lodg'd in their Combs as Honey. From the Sugar-Cane, the Juice being boiled down, leaves it in Form of Sugar ; nor is that peculiar to this one Plant : the Juice of the Maple-kind is, in some Parts, boiled to Sugar, in the same Manner ; and that of the Birch, or any other Tree, or Plant, properly managed, may.

This Juice, which is thus separated in the Flowers, or lodged in the Sap, may shew itself on the Outsides of the Leaves and Branches. It does this on the Oak in our Country, and is there called Honey-Dew ; and in ITALY, particularly in CALABRIA, it does the same on the Leaves and Branches of the Ash, and is called Manna. This is the Circumstance that comes nearest to our present Purpose. In the Course of Nature this sweet Liquor should be kept among the Sap, except the little that is separated in the Glands of Flowers ; but we see that in these two Instances it will shew itself in a separate Form on the Leaves.

It is not the Oak alone in our Kingdom that has this Honey-Dew upon its Leaves ; nor is the Ash the only Kind that has it, in hotter Countries, in the shape of Manna. The Manna of BRIANCON in FRANCE, is gathered from the Larch Tree, and that of PERSIA from the Alhagi, yet these are both true and genuine Manna.

This Juice, which is thus contained in all Plants, may by Accident be brought out to the Surface, and being there dislodged,

dislodged, it will shew itself first in a clammy Moisture, and afterwards, according to the various Circumstances, in a tough Matter like Honey, or in a dry and firm Substance, as Manna. Experiments have been made to prove that the FRENCH Manna did not come from the Clouds, but was the real sweet Juice of the Plant, which perfectly settle this Question. Boughs have been cut off clean in the Manna-Season, and the Manna has been found upon them some time after, tho' they had lain within Doors.

This, and many other Observations of a like Kind, shew that the sweet thick Substance found on Plants, is not rais'd from the Earth, or dropp'd from the Sky, but is sweated out by the Plant itself.

Trees can bear this better than tenderer Herbs, and to this is owing the Difference of its Effects, in not hurting the one Kind, and injuring greatly the other.

This sweet Juice is the Cause of Mildew ; and the Farmer knowing its Nature and Origin, will rationally be led to enquire into the Manner of its doing the Damage, and thence to the proper Remedies.

CHAP. XXV. *Of the Accidents which bring on Mildews.*

THE Reader will see from this plain Account of the Cause of Mildew, what is the Difference between that and the Blight ; we have shewn that it is occasioned by a Condensation of the Juice of the Plant within, and this from a sweating of it out. 'Tis seen, therefore, that though not the same Disorder, they are allied in their Nature ; but as their Causes are different, so are their Methods of Cure.

The Cause of Blights is often a cold Wind ; but the Occasion of Mildew is frequently a hot Sun, and a perfectly still Season. This agrees very well with the rational Account of the Nature of these Accidents ; for Cold is most likely to coagulate the Juices in the vessels, and Heat to draw them out of them.

The poorest and even weakest Trees and Plants are most subject to Blights because in them there is the least Force of Nature to carry on the Motion of their Juices against the Effect of Cold ; but, on the contrary, the richest and strongest Plants are most subject to Mildew, because they bear the richest and the most abundant Juices. From these Observations, conducted by a first established Knowledge of the Principle

Principle and Cause of the Disaster, we see the Errors of the Conjectures made by others, and the unhappy Effects they have taken upon their Practice.

Where most Manure and most Tillage are used, the Plants will be richest: and where, with equal Tillage, there is more Manure, those Plants will, in the natural Degree, be richer than where there is less. On this is founded the Observation, that where there has been most Dung used, the Crop is most subject to Mildew. But those who have credited the Accounts heretofore given of this Accident, being occasioned by Vapours from the Earth, having been led into a very erroneous Imagination by it: they have thought that the Vapours of the Dung caused the Mildew; whereas that Manure had indeed done nothing but its proper Office, and the Crop had fallen under this Misfortune from the great Richness the Plants received from it. Upon this Principle the Farmer will see that a good quantity of Manure will defend a Crop from Blights; and tho' it makes the Plants more liable to Mildew, that may be guarded against by other Measures.

Let the Husbandman keep in his Mind the Distinct Nature of the Blight and Mildew, for this Reason: he sees they require a different Kind of Caution; and in starving his Crop to prevent the one, he may run it into the Danger of the other.

There is at all Times a great Quantity of Moisture exhaled from Trees and Plants, and the abundant Discharge of this, when there is not a due Supply, may occasion both the Accidents of Blights and Mildew; the first in the Spring, the other in Summer. It is the Opinion of Dr. HALES, that when the Moisture is exhaled from Trees, in a cold Spring, faster than it is supplied from the Root, this occasions that Blight in which we see the Blossoms and Leaves of Trees fall in Spring*: and, on the other Hand, when in the Heats of Summer the Quantity exhaled is vastly great, and the Plant is rich in these sweet Juices, they may be exhaled when there is not a sufficient supply of the others; and this the more, the greater the Heat is, and the richer the Ground has been made by Manure.

This is an Accident in the Course of Nature, which often happens without any Damage following it; but when the Weather is less favourable there is great Mischief: this being the real Cause of Mildew.

In the Heat of the Day this sweet Juice comes out; and
while

* *Vegetable Staticks*. Vol. I. p. 368.

while the Heat continues it is not much perceived. It must have been rendered thin, in order to its getting out of the Vessels ; and the Heat which affected that Change in it, keeps it in the same Condition, during the Time the Sun is above the Horizon.

At Sun-set this Juice would thicken from the cooler Temperature of the Air ; but then the Dews cover the Surface of the Plant with Water ; this blends with the thick Juice which lies on the Leaves and washes it away.

Whatever has been once dissolved in a watery Liquor, will readily dissolve in it again ; and as this thick sweet Matter was originally mixed with the watery Juices in the Vessels of the Plant, it naturally and readily will mix with the Dew, which is also watery. This is Philosophy, and this is Truth : the plainest Words best convey Knowledge.

The Farmer sees the natural and proper Course of Things, and in this there is no Accident. No Mildew is seen upon the Plant, tho' the Honey-Juice has been exsuded, because it has been washed off again before it had Time to do Mischief.

If it had lain longer, it would have spread itself over the Surface of the Plant, stopped up its Pores, and spoiled its Growth ; and it would have invited Insects to feed upon it, which would have spread the Mischief farther, as we have seen in Blights.

When the thick Juice is thus quickly washed off the Plant, no Harm happens : when it lies longer, the Mildew follows ; this is the Course of the Accident.

There are Nights in which there is very little Dew ; and, in this Case, as the thick Juice will remain on the Leaves, there is the Foundation laid for the Disorder : but there are yet many Chances for the Crop's escaping. If a Shower of Rain falls the next Day, it will wash away all, and there can be no Mischief to the Plants : if this do not happen there is the Chance of another Night of Dew, and this will still take Place. Even a third Night's Help from Dew, after two dry ones, will answer the Purpose if there be a brisk Wind in the Morning ; but if otherwise there commonly comes on the Damage.

A Wind at any Time, whether after Rain or after Dew, is of the greatest Service against this Disorder ; and it is for this Reason Corn, in open Fields, escapes this Danger more than in Enclosures.

Every Article of Improvement has its Disadvantages, which must be guarded against, otherwise they may counterbalance

lance the Benefit. Thus in the present Instance, the enclosing Land, and enriching it with Manure, both make the Crop the more liable to this Accident of Mildew, but they defend it from many others, and encrease the Product sevenfold. Therefore the Business of the Husbandman is to guard against the Damage attending these Improvements, while he reaps their Benefit.

He will now understand perfectly the two fundamental Points, 1. What is the Cause of Mildew; and 2. What are the Accidents that bring it on. He will therefore have a rational Foundation for his Practice in guarding against the Disorder, and in endeavouring to remedy it when it shall fall upon his Crops in spite of all his Caution.

C H A P. XXVI. *Of the Prevention of Mildew.*

WHEN the Husbandman's Land is rich, and his Crop strong, let him be upon his Guard to perceive this Accident if it happen, that it may not be gone too far before he attempt a Remedy.

Let him provide against it by making his enclosures larger for Corn Land than for Pasture; and by leaving Openings at certain Distances, at the Height of about five Feet.

This is a new Practice we are sensible, but it is of the greatest Importance. It may prevent half the Mischiefs that happen to Crops in enclosed Ground.

We have shewn in speaking of Blights, the great Necessity there is of the Air having a free Passage among Plants of every Kind; and this is always more or less obstructed by Enclosures. The Winds that hurt a young Crop come in only from certain Quarters, these therefore may be defended thicker than the others; and this high Opening in other Places will give all the Advantage of Winds without their Damage.

When this is done, there will be much less Danger of Mildew than on other occasions, but as it will happen sometimes in open Fields as well as Enclosures, 'tis plain this can be no absolute Remedy.

When the Days are hot and there is little Wind, and the Nights are without Dew, then the Farmer is to watch for Fear of being surprized by Mildews. On examining he will find when the Mischief begins, and he will perceive this thick Juice sticking to the Stalks, Leaves, and young Ears of his Corn. It will discolour them, and he will find it first by his Eye from that Circumstance, and then by the Touch,

for

for it will stick to his Fingers. The Consequence of this is, that the Crop withers; the Vessels that should take in Moisture from the Air, as well as throw out the abundant Juices of the Plant are stop'd up, and the proper Course of Nature is obstructed. We have explained in a preceding Chapter, in what manner Trees and Plants are kept in a healthful State, and this free passage of their Leaves, and the rest of their Surface, is a vast Article in their Oeconomy. The Top of the Corn Plant usually suffers most by Mildew, and if it remain any Time, though it should afterwards go off, yet the Corn in the Ear never ripens kindly, but is lean and poor, and however the useless Part of the Plant thrives, the Ear will be light.

It is of consequence to the Farmer to know when this Accident happens, for this Reason; because whatever Remedy is in his Power must be applied in Time, otherwise the Mischief will remain even after the apparent Cause is removed.

With respect to the other Means of Prevention they are few, and not very certain of Success; however, as they can be attended with no Damage, it will be right to try them.

The Fields being known where Mildews are most likely to happen, there must be Caution used accordingly.

As Wheat is more subject to Mildew in these Places, than other Kinds of Grain, and as it is known that the Freshness of Manure makes it the more liable to the Accident, no small Enclosure that has been newly dung'd, should be sown with Wheat; but it should in these places follow some other Crop, as we have shewn various Methods of managing it in that Respect.

Of all the Kinds of Wheat, that which is called bearded Wheat is least liable to Mildew; this Kind should be sown preferably to any other, in Places where the Mildew is likely to happen. The reason of bearded Wheat escaping better than other Kinds is, that its Juices are thinner, though they be equally rich; so that when they are drawn forth by the Sun, they do not hang upon the Plant in that clammy Manner.

This Incident in Nature shews the Method of attempting to prevent the same Accident by Art, by thinning the Juices of the Plant. Manure takes various Effects, and the two contrary are Dung and Soot. Experiments shew, that the Juices of Plants enriched by Dung are the thickest of all others; and that the Juices of those enriched by Soot are the thinnest, although the Encrease in Grain be as great from

one Manure as from the other. For this Reason let the Farmer manure with Soot, where he has Reason to fear the Mildew ; and he may by that Means prevent it.

Those Reasons have always most Weight which are supported by Experience, and we have his Authority in this Case.

HERTFORDSHIRE is the County where most Soot is used as a Manure, and I speak from Experience, that no County is in general so free from this Accident.

Finally, the Farmer will find by examining from Year to Year, his own Crop, that the Wheat which is sown latest is most subject to Mildew ; and that which is sown early very seldom suffers by this Accident.

This is a very important Consideration ; and he will find it the most essential of all Means for Prevention of this Disorder. Every Advantage is on the Side of early sowing of Wheat, and this is among the principal of them. Mildews come usually at a certain Time of the Summer ; and the Corn that is tenderest at that Time, is more subject to be damaged by them ; when it has got a certain Degree of Strength, this Accident will not be able to take much Effect upon it.

A good Husbandman, when he sees what will, in every Respect most favour his Crops, especially this of Wheat, which is the richest of them all, will provide accordingly, that he may take the Advantage ; and of all the Times in the Year he will find the Month of AUGUST to be the best for this sowing.

The Farmers who have been taught to believe Mildew came from the Clouds, have been led into a weak neglect of preparing against them : our Reader, who sees what they are and how caused, will find on the other Hand that so much may be done to prevent this Mischief, that upon providing in Time for the taking every Precaution, he will be under almost a moral Certainty of their escaping.

If he will give his Enclosures Air Passages, sow his Wheat in them at an early Season, and that after another Crop, not upon Dung, and with the Advantage of Soot Dressing, he will need to have very little Fear of this terrible Accident. It may happen at any Time, and under any Circumstances, for there is no guarding against the Extream of some Seasons ; but he will nine Times in ten escape by this Practice ; and see his own Fields healthful, while his Neighbours are worth little. We shall, in the succeeding Chapter, shew what

to be done by Way of Remedy when the Accident happens : but 'tis much better to prevent such Accidents as these, than to remedy them, and happily for the Farmer it is much easier.

CHAP. XXV. *Of the Remedies of Mildew.*

WHEN the Crop has, by a Neglect of any of the needful Cautions laid down in the preceding Chapter, fallen under the Misfortune of a Mildew, the Farmer is not to give it up at once, as entirely lost, but to endeavour every thing for remedying the Disorder. He could not go about this without the Knowledge we have given him of its Nature, but if he consider this, and observe the Relief he sometimes obtains from Nature, he will be led into a right Path for the helping himself. Art, on most Occasions, does best when it most imitates Nature ; but in these Cases there is no Way else by which it can be serviceable.

The Mildew is a thick clammy moisture, which remaining upon Plants stops their Pores, and obstructs their Growth, and the ripening of their Seeds. Nature washes it off by Rains, and blows it away when dissolved in Dew by Rains.

If Rain and Wind come soon after the Accident, the Farmer therefore knows he has nothing to fear ; but a few Days if they do not, will be of vast prejudice to him, therefore this is the Time he is to seize for the doing himself Service.

If a little Rain fall gently, and without any Wind, let him go into his Field and see whether it have done the Business : let him examine the Corn by his Sight and Touch, and he will soon find whether the Remedy sent by Nature has been, or will be, effectual. If he find the clammy Liquor washed away he may sit down in Peace ; but if it remain upon the Corn he may expect Damage, and must prepare to assist in the Remedy.

I have seen when a soft Rain, coming immediately after a Mildew, has been of the greatest Disadvantage, instead of any Benefit. The Mildew itself has only lodged upon the Tops of some Plants, and on the stalks and Leaves of others in small Parcels, staining them and corrupting them more or less in those particular Spots. But when such a drizzling Rain has fallen, it has dissolved the thick Juice which caused the Mildew, without being able to carry it off. In this Manner it has spread it in a Kind of Glazing over the greatest Part of the Plant, whereas naturally it would have only affected a few

Places. This is the worst sort of Mildew that can happen; and in this Case, when Nature has taken the first step, but is not able to perform the whole Cure, Art is to be called in to her Assistance.

In this Situation which the Farmer will easily know from the Account here given of it, let him send a couple, or according to the size of the Field, more stout and careful Fellows in: let each of these cut a long pliant, and well tufted Ash Bough, and leave all the Branches, Shoots, and Leaves upon them, except a few that may be cut off, just for the Convenience of Handling them.

Let these Men thus prepared go into the Furrows, dividing Piece by Piece the whole Field between them, and let them sweep off the wet and Mildew together, with soft strokes of their Ash Boughs.

These, with their Leaves, will make a Kind of soft and full bodied Brushes, which will sweep off all without breaking a single Stalk. The strokes are to be made first very gently down, and then with a gentle slanting upwards, carrying on the Boughs a yard or two before they are brought above the Tops of the Plants. This is a secure and perfect Method of getting rid of the Mildew when some Rain has fallen, and there is no Wind to assist. It does the Business much more perfectly: it is a way of washing and wiping every Stem; and is in this Manner done with very little Trouble.

When a Mildew is seen upon the Crop, and there comes no Rain to wash it away, the first Consideration is, whether there be a good favourable Dew. In this Case the same Assistance may be given by Art, as in the other; and the Damage altogether prevented. The Dew will hang in large Drops, and is more easily got off than the Rain; and it melts the Mildew as effectually. If it remain till the Sun evaporate it, then the Mildew is left behind, for Heat draws up only Water; but if it be carried off any way before the Sun's Heat take this Effect, the thick Juice, causing the Mildew, is carried away with it, and all Damage is prevented.

A brisk Wind, blowing early in the morning, will effect this; but, if there be none, some such Course must be used as in the former Case: but as the Dew hangs in larger Drops than the Rain, it will be easier dislodged, and therefore a shorter method may be taken than the brushing it off by Ash-Boughs. To this purpose, a Couple of Men must be sent into the Field an hour before Sun-Rise, with a long Cord; they must walk in the Furrows at the Distance of the Length of the Cord; and one holding one End, and the other the other,

ther, they are thus to draw it over the Crop: this will lay so much hold, as to shake off all the Dew-drops; and the clammy Juice, which Causes the Mildew, will go with them.

This is a short, easy, and expeditious Method, and it rarely fails of Success; no Injury whatever is done to the Corn, and the clammy Juice, thus rubbed off and scattered on the Ground, dissolved as it is in the Dew, serves as a kind of Manure; for nothing is richer than it, and the Whole gets to the Root.

In these Cases, we see the Boughs or the Cord serve in the Place of Winds, to shake off the Water in which the mischievous Matter is lodged. But we have observed that, as in some Instances, there may want Wind, while there is Water enough, so in others, there may want both. There may be no Showers, and the Nights may yield no Dew: this is a Condition nearly desperate to the Husbandman: no brushing or shaking will dislodge the clammy Moisture, when it is not dissolved first; and even the strongest winds would, in this Case, answer no Purpose.

As the Office of a Wind may be performed by Art, as we have shewn, so that of Rain and Dew might, if there were Conveniencies; but they are commonly wanting on such Occasions.

If the Crop be of small Extent, and there happen to be a Pond or Spring of Water near, the Owner may sprinkle over the whole with an Engine, with a Fan full of small Holes at its Top; and, after this, the Boughs or the Cord, according to the Exigence of the Case, will answer the Purpose. Thus the Mildew may be diluted and cleared off, by Means altogether artificial: but there seldom are Opportunities of doing it: indeed, never in the full Extent in very large Concerns. However, by this the Husbandman sees the Compass of what he can do, or what he can attempt, and he may suit his Operations to the Occasions.

The Crops of Corn are not the only ones which may require the Husbandman's Care in this particular; many other Growths are as frequently affected by it; indeed, all Kinds are more or less liable to it, and he is therefore to watch in every instance, and use this Precaution for every particular; which in many other Kinds, will come more easily into Use than in this.

We have recommended to him the Planting of Hops, and promised him very great Advantages from that Crop; but Hops are no more exempt from Mildew than other Growths:

frequently they are damaged, and sometimes they are altogether destroyed by this Accident.

There is no Crop need more careful Watching on this Account. We have laid down the Methods of examining whether it be coming on; and, according to the early Notice of the Mischief, obtained by these Means, will be the Prospect of Success in the Remedy.

As soon as the least Appearance of it is perceived, let the Plants be watched; and, after a Shower, if any falls, or if not, early in the Morning, while they are wet with Dew, let them be well shook, Poles and all; if this do not prove sufficient, let them be brushed with the Ash-Boughs, taking Care not to hurt them, for it will be easy with these leafy Brushes to wipe over ever Part, and not bruise or break any.

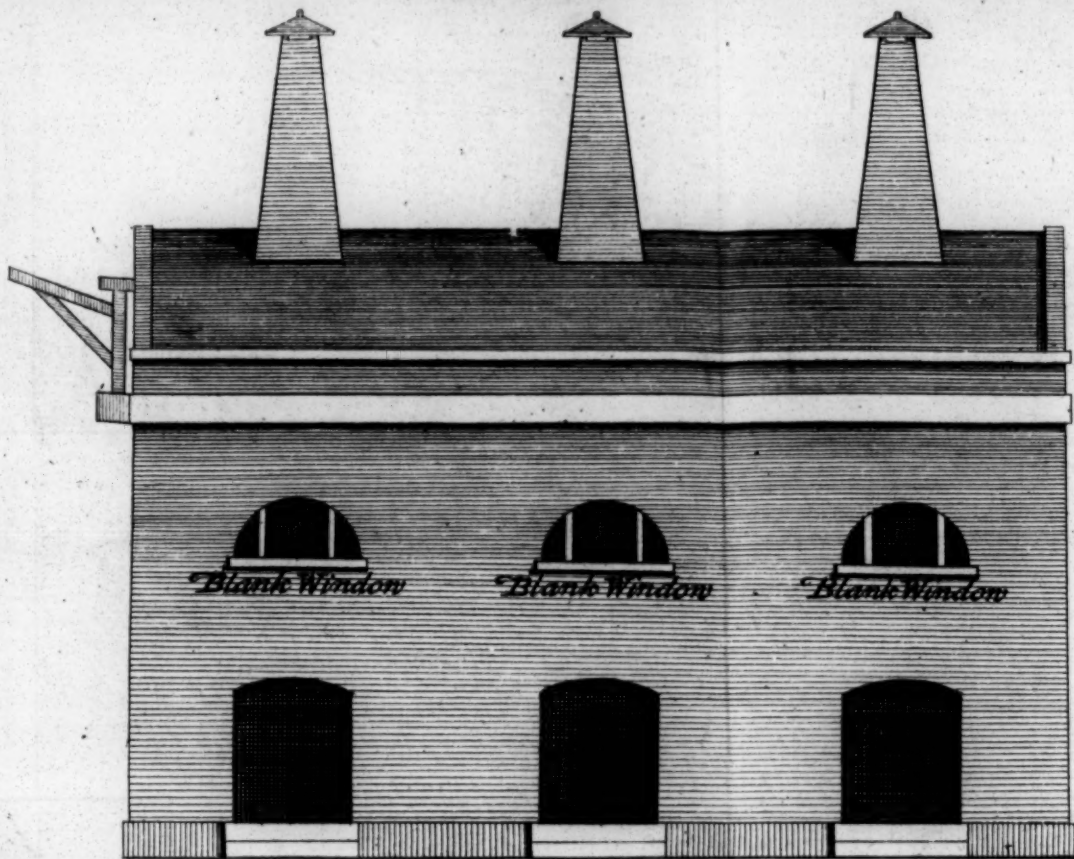
When there is Rain or Dew this Method will be sure of Success in the mildewed Hop-Ground; and when there is neither, the Engine must be called in to sprinkle the Plants.

This may be done very conveniently and easily in a Hop-Ground, tho' it can scarce be performed at all in a Corn-Field of any Extent; and it will be very well worth the Labour, because it will answer a double Purpose: it will at once clean the Plants, and Water the Ground. This is always useful, in the highest Degree, to Hops, when the Season is dry toward the Time of their growing to Ripeness: and frequently it will happen, that the Produce shall be greater after this, than if no such Accident had happened.

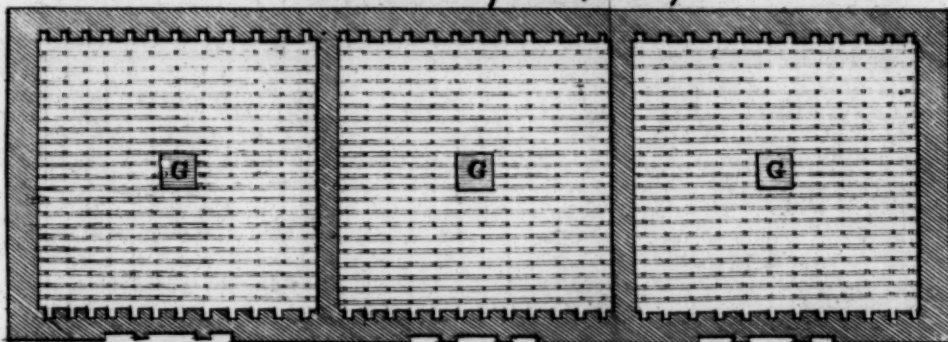
Having thus gone through the Care of the Land, and Management of a Crop under every Circumstance, nothing remains for the completing this Part of our Work, but the informing the Farmer how he may best preserve his Corn when he has reap'd and thresh'd it: and this we shall give in the Words of a Correspondent, to whom we have been often before obliged on the most interesting Occasions; and whose Discoveries and Improvements on this Head demand the Thanks of the Publick, more than the Labours of most other Enquirers.



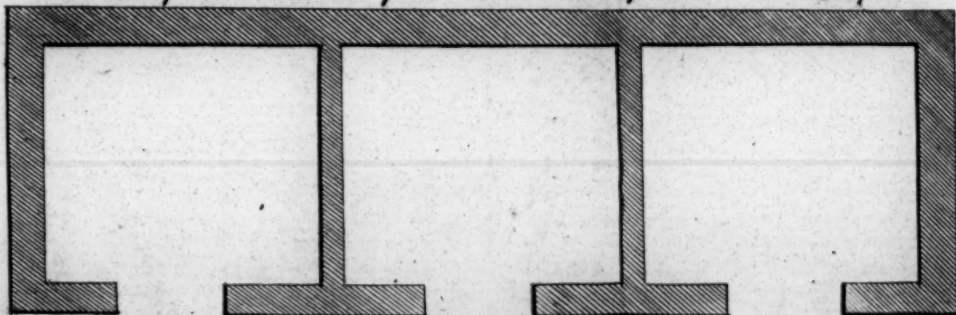
Plate. 1.



Elevation of the Granary

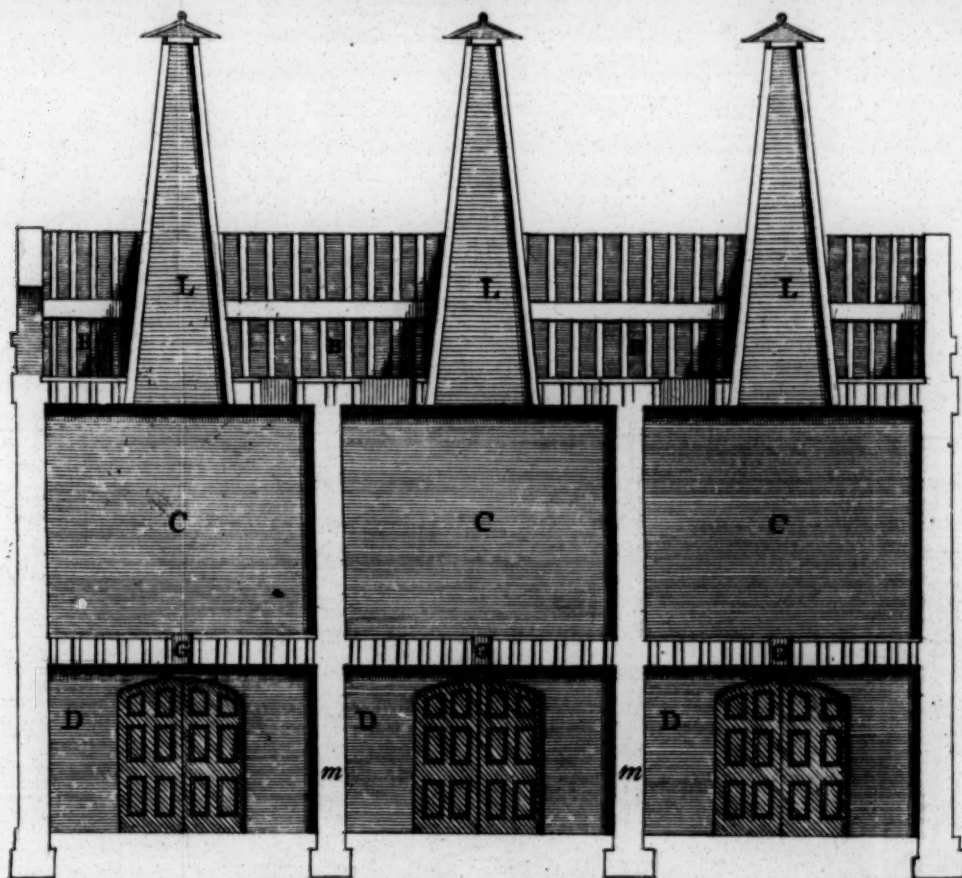


Plan of the Chamber floor where the Grain is to Lie



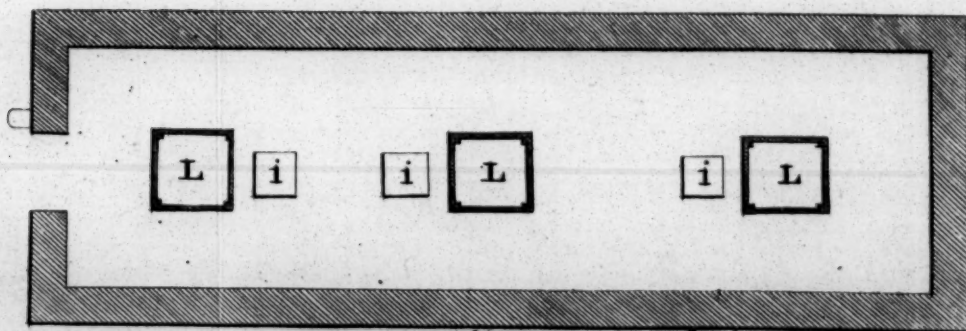
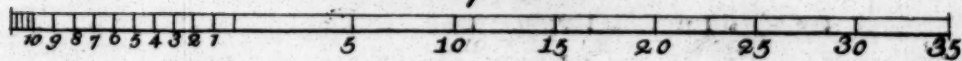
Plan of the low floor

Plate. 2.



Section of the Granary Length ways through i.^e Middle

A Scale of Feet



Plan of the Garret floor

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Ventilating Granary,

For the Preservation of Corn in a State of Rest; with the Plan and Construction of it: Also, some Observations and Directions about sound, and tainted or ill-saved Wheat, with Respect to their Preservation in this Kind of Granary.

Principles upon which this Granary is built.

AIR, consequently Dryness and Coolness, duly administered together, with sufficient Security against Vermin, seem to be the Essentials necessary to the most convenient Methods of preserving Corn, for all its Uses, for several Years together in a Granary or Magazine, without stirring.

N. B. A Granary or Magazine, on these Principles, should not be built in a confined Situation; as, near the shade or Shelter of Trees or Buildings, but where the opposite East and West Sides of such Granary may be properly exposed to those Points: in which Case most of the intermediate Points between them and the North and South, will act upon this Granary more or less, according to the Velocity of the Wind, by fixing the Folding Doors thereof properly, at such Times when the Corn is to be ventilated.

REFERENCES to the PLAN.

Plate 1. Elevation of the Granary or Magazine to be built of Brick or Stone, of various Dimensions, according to the Occasions of the Owner; but here (as a Specimen) only 46 Feet long by 17 broad, from Out to Out.

Pl. 2. Section of the Granary Lengthways through the Middle.

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B. B. B. B.

B. B. B. B. The Garret, all in one Chamber, into which the Corn may be received by Means of a Crane or pully fixed over the Door (k) (Plate 1) on the North Gable of the Building; to which Door a Ladder, or Flight of Stairs on the Outside of the said Gable may communicate. This Garret may occasionally be made Use of as a Store Room for Corn, that has already been preserved two or three Years in the Chambers below, marked (C.C.C.) or for other Kinds of dry Goods, leaving a few Air Holes only in the Gable Ends of this Garret Story.

C. C. C. Three Chambers where the Corn is to be first repositied, in order to receive the necessary Ventilations for a Year or two, or more, till perfectly cured or sold; each Chamber here, about 13 Feet square, by 12 high; to be divided from each other by Brick Partitions (m. m.) carried up from the Ground. The sides of these Chambers to be neatly covered with Stucco Plaister.

G.G.G. The Floors of these Chambers, to be supported with whole double Deals laid Edgeways, and covered with narrow Deal Boards, not exceeding six Inches in Breadth, leaving a Space of near an Inch between each Board, that Room may be given for the Air to ascend equally through these several Interstices in the Floors, in order to ventilate the Corn contained in these Chambers, as Occasion requires. (vid. Plate 3. Fig. 1.) These Floors, or at least the Interstices between the Boards, to be covered with close Wire Grating, that will not admit the Grain to pass through; or the Floors may be covered entirely with a proper thin, but strong Hair Cloth, nailed down round the Confines of the Floors, before the Corn is lodged.

G.G.G. Small Trap Doors (vid. Pl. 3. Fig. 1.) to be made a Foot square each, one in the Centre of each Floor; which may be opened occasionally, to let out the Corn into the Ground Chambers for Use or Sale; and may at such Times, if a brisk Wind sets in and through the Ground Chambers, prove a good Winnowing to such Corn to prepare it for Market, especially if the said Trap Doors be humoured by the Hand, so as to let fall the Stream of Corn thin and diffused on the clean ground Floors. These Trap Doors to be free from Wire Grating or Hair Cloth, over their Dimensions; to be affixed by Hinges, so as to open into the Ground Chambers; at other Times kept fastened with a cross Iron Bar Staple and Pad-Lock, to prevent Imbezement. The Ceilings of the Chambers C. C. C. must be made as much Air Proof as may

may be, either by some excellent close Plaister Ceiling, or only by caulking the Joints in the Garret Floor above, pitching the Seams afterwards, and dashing drift Sand on the Seams after the hot Pitch Brush, by which Means no Air can pass out of the Chambers C.C.C. except through the Flues (L.L.L.)

L.L.L. The Flues, to be made of a Piramidal Figure, with Beams erected at the four Angles of each Flue, well barred and braced together, and covered with Laths and Plaister, so as to be tight and Air-Proof; to be four Feet square each at their Bases, and well fixed in the Garret Floor, and to the Roof Timbers; to be erected directly over the Trap Doors (G.G.G.) and elevated twelve or fourteen Feet above the Ridge of the Roof of the Building; their Openings at their Tops to be a Foot square each; a Piece of Brass Net-Grating to be fixed half an Inch within their Muzzles, to prevent Sparrows or other Annoyances descending to the Corn below, and also to admit of a Cover or Valve, falling close on their Muzzles. These Muzzles to be well guarded from Rain and Snow by proper Umbrellas, elevated a little above them, and well fixed to the Continuation of the four Beams of the Flues. The Valves just mentioned to be made of square Pieces of Oak Board, exceeding the square Dimensions of the Orifices of the Flues, by two Inches on every Side; a Plate of Lead of five or six Pounds weight, to be nailed on the Top of each Valve; the Valves underneath to be lined with Buff, well soaked in Pickle, to attract the Moisture of the Air, swell and stop close. These Valves to open or shut by Means of a small Cord, fastened to a very short cross Sling of the like Cord, which cross Sling communicates, and is made fast to four Staples in the four Corners of each Valve; that the Valves may be raised and lowered evenly on their respective Muzzles, by Means of a small Cord passing over a Pulley fixed under the Centre of the Umbrella, and down between the Lath and Plaister; and the boarded Lining of the Flue comes out to hand in the Garret, through a small Hole in one Side of the Flue, which Hole should be made through a piece of Wood fixed in the Framing of the Flue; and the upper Edge of the said Hole, on the inside of the Flue, should be guarded by a small Roller of Wood, to ease the Friction of the Cord upon drawing up the Valve, and keeping it in that Situation by a Weight somewhat superior to that of the Valve itself, hung to the Cord End in the Garret, or the Cord may be made fast to a Hook in the Garret Floor, making Allowance for the lengthening and shortening of the Cord by the Weather, that it may not be in Danger of breaking; these Valves or Covers should

should also be guided in their raising and lowering, by four fixed upright smooth wooden Bars, which may lodge them equally on the Squares of their respective Flue Mouths. These Valves or Covers might be contrived to be opened and shut by other Methods, but this seems to be one of the most simple, and least liable to Disorders and Repairs. The chief Use of these Valves (and a very considerable one) is the keeping out the moist foggy Air from descending upon the Corn, when the Granary is not to be ventilated

i. i. i. Trap Doors in the Garret Floor, for laying in the Corn into the Chambers C.C.C to be two Feet and a half square each, well fitted to their receiving Jambs, and made tight with Clay well tempered with Salt and water, after the Chambers are charged with Corn.

D.D.D. The Ground, or lowest Chambers that should be admitted in a Building of this Nature, the Sides of which to be smooth plaistered, that Rats or Mice may not be able to ascend to the Corn-Floor, nor should any Goods or Lumber be admitted into these Ground Chambers, because they would diminish the Diameter of the Quantity of Air to be admitted into them, and consequently of its Weight and Pressure necessary to force its Way up through the Interstices left in the Corn Floors, as before described.

E.E.E. Large Folding Doors to each Ground Chamber, opening outwards; which, when set open and properly fixed, may catch the drying Side Winds, and direct them into their respective Chambers. The like folding Doors to be on each Side of the Building, East and West, opposite to each other, so that upon ventilating the Corn above, the Windward Doors only are to be opened; at all other Times, when moist Weather prevails, all the Doors, as well as the Valves before-mentioned, to be kept shut and close as possible; for which Reason these Folding Doors are to be truly fitted to their Jambs, as also to their upright centre Posts where they meet, bolt and lock, or by a strong cross Bar and Pad-Lock on their Outside; and the Borders of these Doors, at all their Meetings on the Inside, should have a List of Buff nailed round them with Sprigs, in order to prevent an Indraught of moist and foggy Air, as much as possible.

Mice and other gross Vermin, will find great if not insuperable Difficulty, to get Admittance into this Granary; and Insects infesting it, may be destroyed by Brimstone set on Fire occasionally in the Ground Chambers, keeping the folding Doors, as well as the Valves above, close shut at such Times

of

of stoving, and it should be well stoved before it be replenished with Corn.

It is sufficient only to remind many People, that the Acid Fume of Brimstone confined, kills all Insects within its Circulation, and no Doubt discourages their Approach for some Time after; and may probably tend to abate Fermentation in the Grain, which is generally, if not always, occasioned by superabundant Moisture and Heat.

REASONS *offered for the Operation and Effects of this* VENTILATING GRANARY.

When the dry ponderous Air is directed into the Ground Chambers, by their folding Doors, and strongly pressed in by the continual impelling Force of its own Current; being there accumulated, it will endeavour to expand itself on every side, by its own elastick Spring: and so passing through the Interstices, before-mentioned, in the Floor above it, at the least resisting Vents will insinuate itself through the Wire Grating or Hair Cloth, into the numerous Interstices between the Grains of Corn; through which its Motion will be greatly expedited by Means of the Flues above, when open; as the Air at their Tops being above forty Feet from the Ground, will be much rarer than in the Ground Chamber below, where it will be greatly condensed by the Pressure of the superincumbent Atmosphere, and also by the impelling Wind or Current of Air, continually driven into the lowest Chambers. The Air therefore, always endeavouring to expand itself in the lowest Chambers, to those Parts where it finds least Pressure and Resistance, will continually tend from the lowest Parts upwards, and so produce an adequate Circulation of Air through the whole Bulk of Corn, whereby it will be ventilated and kept cool, dry, and sweet, though in a state of Rest, for several Years together, and longer than the private Owner should lie out of his Money.

Farther Observations on the Usefulness of this Kind of Granary.

In this Kind of Granary, Wheat may be lodged in Bulk ten or twelve Feet square every Way, or whatever the square Contents of the Corn Chambers be, the Wheat may lie therein within a Foot, or half a Foot of the Ceiling, but half a Foot is a good Distance at first laying in the Corn, for it will soon sink lower as it dries. This is a vast Advantage in Stowage over the old Granaries, where they dare not lay the Wheat,
for

for along Time after laying it in, above eighteen or twenty four inches deep, and that too, frequently turned and aired by Hand-labour and Expence, for fear of its heating, musting, and breeding the Wevil; whereas this Kind of Granary, ventilated as it were, *per se*, and in a Manner without any Trouble or Expence attending it, will preserve at least five Times the Quantity of Wheat upon every Foot of its Flooring more than the old-fashioned Granaries can do.

N. B. The Ground Chambers need not be above seven Feet high, under the Floor Timbers; and a Brick Floor, or one of Clay, Lime, and Smiths Dust well tempered together, is fittest for the Ground Floor.

In large Military or Publick Magazines, greater Bulks of Corn may be supported by upright Props under the Floors, and the Ventilation proportioned by adding more Flues to each Corn Chamber, and proportioning the Dimension of the folding Doors thereto, or the number of them.

The Author having never seen or heard of any Granary of this Kind in Practice, submits it to publick Scrutiny, Censure, or improvement.

The Distinction and Difference between sound and tainted or damaged Wheat, and their different Treatments in Order to their Preservation in this Kind of Granary.

If Wheat be dry and well saved at Harvest, free from black, blighted, or footy Ears, has afterwards had its due Sweat and Melioration in Rick, Cock, or Barn, for five or six Months, and after threshing out, has been well cleansed and screened; such Wheat may truly be called sound, and when lodged in this Kind of Granary, may be easily preserved therein for many Years, by ordinary and moderate Ventilations.

For Instance, being threshed out in JANUARY or FEBRUARY after reaping, well cleansed, and lodged in this Granary; it may be ventilated once a Week, if Opportunity offers, for the first two or three Months in Spring, which will be a great Advantage to the Grain, before the sultry heats of Summer come on, when it should be ventilated as often as a proper Breeze or Gale of Wind offers, and once a Month, a few Matches of Brimstone set on Fire in the Ground Chambers, as before directed; in the Autumn, the Winter, and Spring following, two or three Times a Month may be sufficient to ventilate, without applying the Brimstone Fumes; but the second Summer ventilate twice or thrice a Month, and apply the Fumes once or twice during this second Summer; after
which

which Time it may be sufficient to ventilate once a Month during the second Autumn, Winter and Spring, and twice a Month during the third summer, when it may be said to be thoroughly cured.

It may not be amiss during the first Year or two after the Wheat is lodged in this Granary, to inspect the Condition of the Corn, by opening the Trap Doors in the Garret Floor, especially in Summer Time once or twice; for as Moisture or Vapour of the Corn will always rise to the Surface of the Bulk, though the Centre may be dry, so the Appearance of the Surface, as to Moisture or dryness, may regulate the Number of Ventilations necessary for its Preservation.

It is certain from Experience, that sound Corn that has been well preserved in common Granaries, by frequent Turnings and Winnowings, and afterwards laid two or three Feet deep, or more, seldom sweats, gives, or ferments after the first two Years, except it receives accidental Wet or Moisture, from which it is easily freed with a little Care; whereas it is a long Time parting with its natural internal Moisture, which is the greatest Enemy to its Preservation.

It is no less certain that Wheat, being well preserved by any Method whatsoever, has, after several Years so kept, been found to produce more and better Flour for Bread, than some of the same Field and Crop did soon after its being threshed out; because the aqueous Humidity of the Grain evaporating by keeping some Years, the Flour comes cleaner from its thin Bran under the Stone.

It is equally certain, that Wheat so preserved for several Years, has proved very good Seed Corn, and probably not so liable to produce the smutty Ear; Excess of Moisture, either in the Seed, the Soil, or the Seasons, being the chief Cause of that grievous Complaint, except the Seed itself be smutty, and then the Crop also will be smutty notwithstanding dry Seasons.

But if Wheat has been ill-saved at Harvest, or be in a contrary Condition, in any or all Respects, to the sound Wheat described above, which would certainly give it a strong Tendency to heat and Fermentation, in a Bulk of ten or twelve Feet deep, and so induce the Wevil, and other Maladies, to the further Damage or Destruction of the Wheat. It will therefore in this Case be necessary first to cleanse well by Screen or Tryer, after which give it a very gentle and slow drying upon a Kiln, equal only to a strong Sun Heat, till the Grain be somewhat hard under the Teeth; then laying it on a Floor to cool, for some Hours, put it into
Sacks

Sacks half filled and tied fast, and so rub the Wheat well therein on a smooth Floor with both Hands, frequently turning the Sacks over every Way, in order to loosen and free the Grain from its black footy Dust; then winnow clean, after which it may be laid into this Granary ten or twelve Feet deep, and there treated in every Respect like Wheat originally found.

Such Wheat, after such Treatment, will turn out much better for Bread, though kept two or three Years or more in this Granary, and sell for a good deal more Money than it would have fetched in its first tainted and foul Condition.

Yet such Wheat, though by this Method made proper for Bread, should by no Means be used for Seed; for Kiln-drying, more or less, abates or destroys its vegetative Quality; and even without drying, a distempered Seed seldom or never fails of producing a distempered Crop.

J. S.

B O O K VI.

Of the Diseases of Cattle and their Remedies.

IN FIVE SECTIONS.

SECT. I. *Of HORSES.*

The INTRODUCTION.

WE have now according the Course and Method marked out in our Plan, gone thro' every Article of the Farmer's Concern respecting the Choice of his Cattle for Stock; and the Growth and management of every useful Plant that he shall have Occasion to cultivate. We come now to consider those Disorders to which the several Kinds of Cattle are liable, the Methods of guarding against them, and the Medicines most approved in their Cure.

We have had Occasion to observe, on many Occasions, how greatly the Farmer is mis-led by those who should give him Information in respect of the Management of his Crops; but this is an Article less understood, and more injudiciously treated than any other; and it is, at the same Time, of the greatest Concern. The Loss of his Cattle is not to be recruited

cruited but at a very considerable Expence ; and the Care of them is, in general, committed to Persons so very ignorant, that little better than their absolute Loss can be expected, when they fall into any considerable Disorder. They must have Strength indeed, and good Luck into the Bargain, if they can escape from their Diseases and such Doctors.

Unhappily, while those Persons, who undertake the Cure of these Creatures, are so ill qualified to succeed in it, the Farmer himself is less able to judge right, than they are to act. It is a Part of needful Knowledge farthest of all removed from his Enquiries, and he is obliged to submit to every thing.

A few names of Disorders got by Rote, are generally the whole Stock of the Country Leech's Knowledge, and these he applies at Random to any Disorder that comes before him, boldly, because he knows none can contradict him.

A smaller Store of Remedies serves his Purpose, than of Names for the Disorders; for these are People who, like the advertising Doctors, cure many Diseases with one Medicine. Their Physic they use as much at Random as the Names of Disorders; and the unhappy Farmer is stripped both of his Cattle and his Money by their Ignorance. If they destroy the Beast, which would, if let alone, have of itself recovered, he is persuaded the violence of the Disorder killed it, and satisfies his Mind that he has done all he could.

This is the Condition of the Knowledge Country Pretenders, in general, have of the Diseases of Cattle: 'tis impossible to represent it worse than it is; but from this Condition of Ignorance we hope to restore it in the succeeding Chapters.

We shall insert in them nothing but what is the Result of Experience. We shall inform the Owner what he may do for his Cattle himself, and lay down such plain Rules for the Conduct of others, that he will be able to know whether they act according to Reason and Knowledge.

If the Practitioners will study in the same Pages, we promise them, they will find only Truth and what Experience confirms: we request them to peruse them carefully, not only for the Farmer's Sakes, but their own; and hope they will consider the Harshness of what we have been obliged to say, as no more than a just Representation of their Need for better Information: 'tis one of those Wounds that is necessary to be opened deep, in order to reach the Cause of the Malady; and they know these soon heal when proper Methods are followed.

The

The Freedom we have taken with their profession, is to let the Farmer into his Danger, in reposing too much Confidence in his Knowledge; for it is for his Service we are writing: at the same Time we shall observe, that there are many particular Practitioners of more Knowledge; and to these we refer what we shall publish on the Subject, desiring them to be Judges between us and their more ignorant Brethren, whether they do not deserve all we have told the Farmer concerning them, by their rash Practice, and whether what we shall propose to them be not founded on the true Principles of the Art. We write for real Use, and have no Respect of Persons.

The Horse is the most valuable Creature in the Farmer's Stock, both with Respect to his Price and his Use. The whole Care of chusing, managing, and breeding this Animal, we have delivered in a preceding Part; but, in this Place, he claims a very particular Regard, both for the frequent Disorders to which he is liable, and the familiar and easy Methods by which the far greater Part of them may be remedied, when they are rightly understood.

We shall give Directions for preparing the several Kinds of Medicines useful on ordinary Occasions; and we shall also enter upon the worst Diseases to which he is subject, not contenting ourselves, in the customary Way, with setting down the Name of the Disease, and then the Remedy for it; but explaining what it is, before we give Directions what should be done to cure it. Without this, all that can be written is useless; and this has been the Reason that from what has hitherto been published on this Matter, so little Good has accrued, or so small a share of Knowledge has been communicated either to the Farrier or to the Farmer.

C H A P. I. *Of the Glanders.*

WE have taken for the first Consideration, under the Article of the Diseases of Horses, this which is the most important of them all, and, in general, the least understood.

Many have called it incurable; and indeed, according to the old Practice, it must have been so: for if ever a Horse recovered under that Management, Nature must have performed the Cure: it is impossible they should so much as have assisted in it, who knew nothing of the Seat and Nature of the Disease.

Of

Of late Years some Persons of Skill have undertaken the Cure of Horses; Anatomy has been called in to assist in the Operations, and Dissections made of morbid Bodies of that Animal, to shew the Cause, Situation, and Nature of their Diseases.

From this rational Method of Study, we have been made acquainted with the Origin and true Nature of the Disorders of these Creatures, and thence may proceed properly to the Cure.

With Respect to the Glanders, this was more wanted than in Regard of any other Disorder; and it is but very lately we have attained the Knowledge. A Farrier to the King's Stables in PARIS, his Name LAFOSSE, made the Discovery; and the Royal Academy of Sciences received and adopted it. This is the true Road to Knowledge; when the most honourable Assemblies will receive and give their Sanction to Truth, from every Hand that offers it, and do Honour to any one who can do Service to the Public.

CHAP. II. *Of the mistaken Notions concerning the Glanders.*

THE Glanders is a Disorder so well known, that it may seem superfluous to give any Account of its Appearance; but nothing is less understood, in general, than its Cause.

It is a Running at the Nostrils. First there is a whitish Liquor discharged; afterwards, as the Disease gathers Strength, a brownish Matter; and, last of all, a bloody Water.

All these are voided in very great Quantities, so that the Horse is offensive to the Sight, and the Discharge wastes him continually.

This is the Disease called the Glanders, which has destroyed Thousands of Horses; and from which very few have escaped that were once seized with it: not that the Disorder is incurable, but that from a universal Mistake, concerning its Nature, none knew how to go about to cure it.

The Reader will be astonished, that among so many Conjectures as have been made about this Disease, none came near the right; and that People should search in the remotest Parts of the Body for the Seat of a Disorder, which all the Time was situated where it appeared.

The various Opinions that have been advanced concerning the Origin and Nature of the Disease, have occasioned various and almost innumerable Methods of treating it to be proposed,

posed, and these Opinions being all erroneous as to the Cause, it is no Wonder that not one Horse was ever cured by the Methods established on those Principles. Where the Truth is not known, wrong Guesses are endless, and all that is founded upon them must be also erroneous.

The oldest Authors on these Subjects, supposed the Seat of the Disorder to lie in the Brain; and they imagined that, at last, the Brains themselves run out thro' the Nostrils, and to that attributed the Death of the Creatures: mistaken and erroneous as such an Opinion was, these were got nearer the Place of the Disorder than many who followed.

The next Conjecture was, that the Disease lay in the Back-Bone; and that the Discharge thro' the Nose proceeded from the Marrow of that Part. This was a received Opinion many Years among our Farriers, and is so, in most Places, to this Day; from whence they call the Disorder, The Mourning of the Chine.

Later Authors have supposed the Disease to be in the Liver, some in the Lungs, some in the Kidneys, and others in the Spleen: to all these proper Remedies have been proposed; and the Glanders has been attempted to be cured by Diuretics and Deobstruents.

Mr. SOLLEYSSEL, an Author of great Credit, adopts all these Parts as possible Seats of the Disorder; and traces the Matter by Way of the Cæliac Vein, up to the Head, where he supposes it is lodged upon the Parotid Glands, and thence discharged through the Nostrils. This appeared so learned, that it was supposed it must be true: People are always ready to reverence what they do not understand; and the Farrier and the Farmer thought nothing could be a Secret to a Man who could use so many Words they never heard before. On this was founded a Practice for the Cure, which, like the rest, was as ineffectual as the System was erroneous.

After this, the Lungs were considered as the Seat of the Disorder. Others attributed it to Knots and Swellings under the Caul: the Authors of the Dictionary of TREVAUX, adopt the former of these Opinions; and the latter is found among the Systems in our Mr. CHAMBERS.

We have named these several Opinions, to tell the Farmer that they are erroneous. Experience, Dissections, and certain Observations, have shewn they are false: let him therefore take Care that he is not mis-led by them, and that he place no Dependence upon the Methods of Cure founded upon them.

In general, all internal Medicines are useless in this Case. The Horse may have a bad State of Blood at that Time, and this may render the Cure, in the Method here to be proposed, more difficult. In this Case, the common Sweetners of the Blood may be properly given at the Time he is under Cure; such as Brimstone and Antimony among his Corn, but otherwise they are not wanted.

C H A P. III. *Of the real Situation and Cause of the Glanders.*

AFTER all that has been written plainly or pompously, learnedly or ignorantly, on this Subject, it is plain from observing the Nature and Progress of the Disorder, and from the fruitless Attempts founded on these Opinions to remedy it, that the Cause doth not lie either in the Brain or the Back-Bone, the Liver or the Lungs, the Spleen or the Kidneys.

Anatomy, Observation, and a certain and regular Method of Cure, founded upon those Experiments and Observations, prove that the Seat of the Disorder is where it appears; that no Part of the Creature is affected but the Nostrils; and that the Disease really lies in the Glands, which are situated in the thin Skin that covers their Inside.

When the Glanders are only in one of the Nostrils, a strict Examination shews that the Gland, or, as Farriers call it, the Kernel, which lies near the Jaw-Bone on the same Side, is found to be swelled and inflamed, and not that on the other Side; but as soon as both Nostrils run, then both these Kernels are found to be swelled in the same Manner.

This Disorder may very naturally proceed from a Cold, without the Blood's being at all concerned in it; though it may happen, in other Cases, that the Blood is bad at the same Time, and then the Disease will be more difficult to cure.

When these Kernels are inflamed, the Running at the Nose comes on, and this is the first and gentlest Stage of the Disorder. The Horse's holding down his Head to feed, and its natural Situation, combine to increase this Running; and thus a Disorder is begun in a natural Way, and continued by natural Means, which is generally strengthening itself, while the Farriers are attempting its Cure by Drenches; not one of which can possibly have the least Effect upon it, because they are levelled at an imaginary Cause.

For the Satisfaction of those who would not part with the Opinion of the Glanders proceeding from Disorders of the Lungs and Spleen, or the Liver and Kidnies, all these Parts have been examined by Dissection, in Horses that have died with the Disorder upon them in its utmost Violence, and they have been found all sound: therefore it is plain they have no Share in the Cause: it lies wholly, as we have shewn, in the Parts where it appears. It may come from a simple Cold in the Horse, without any other Disorder to cause it; tho' it may also, in some Instances, be occasioned by the Matter of a Disease falling upon that Part, or be rendered worse by a bad State of Blood. In these, which are particular Cases, the Method of Cure is however to be the same with the small Allowances we have made already on that Head, of a bad State of the Blood; as to the other Case, it requires no particular Consideration; for though a Disorder of another Kind may have been the Cause of the Glanders, by settling on that Part, yet, when once settled there, it is the same as if the Glanders had come in a natural Way; and the same Method will prove a Remedy.

To explain the Seat and Nature of the Disorder perfectly to the Farmer, we are to inform him, that there is a thin Skin which lines every Part of the Nostrils of a Horse. This is the Seat of the Glanders. He will observe in the Nose of a Horse, a Partition going all along the Inside, which divides it into two Parts, or the two Nostrils. This Partition is covered in every Part with the Skin we have named: it is thin, soft and tender; and in it there are many small Kernels. These separate a soft Moisture for rendering the Skin supple and sensible; and this is all they are to do in their natural State; the Abundance of their Discharge being a trifling Thing, and thrown off without Offence: but these Kernels will, by being disordered, separate a larger Quantity of a fouler Matter, and this is the Glanders.

On each Side of the Partition which divides the two Nostrils, there are large Holes or Cavities. The same Skin which covers the Partition itself, is also continued to them, and forms a Covering to their Bottoms and Sides; but in this Part, the Kernels are fewer and smaller than elsewhere, and they only separate a very small Portion of the Moisture for just keeping the Skin there soft.

This is a very happy Provision of Nature; because the lowest and innermost Parts of these Hollows are so deep and winding, that if any Redundance of the Matter had been separated there, it could not have been discharged as in the other
Parts;

Parts ; and Nature would have been loaded and obstructed by the remaining of it upon the Place.

The Skull of a Horse is composed of several Parts ; and in that Piece which forms the Forehead, just above the Place of the Eyes, there is a Space or Gap between the two Plates of the Bone : these make what are called the frontal Sinus's ; but the Farmer, without troubling himself with remembering such Names, will understand that there are such Cavities ; and this will be enough for his Purpose.

These Cavities are covered throughout on the Inside with this same Skin, which covers the Partition of the Nostrils ; and it has in this Part the same Sort of Kernels as elsewhere.

All this Skin, and all the Kernels in it, are the Seat of the Glanders. In the Beginning, the Kernels only swell, and discharge a great deal too much Matter ; and these in the Hollows of the Forehead-Bone most of all. They are therefore the main Seat of the Disease. When it becomes violent, they are ulcerated or grow full of little Sores ; then they discharge a more offensive Matter ; and at length the whole Skin of this Part is enflamed, swelled, and eaten to Pieces, and then comes the Discharge of a bloody Matter.

This is no fanciful Supposition, but is the exact and real Fact found by Examination.

When the Head of a Horse, violently affected with the Glanders, is opened, not only the Kernels are found to be swelled and sore, but all this Skin is full of Ulcers ; and it is seen to be grown much thicker than naturally, and fuller of Blood-Vessels ; and these are eaten to Pieces at their Ends. From these flows the Blood, and from the ulcerated Glands the Matter, which are seen to come from the Nostrils of the Horse in this Disorder ; and this is the true Nature and Cause of the Discharge: the Glanders is nothing but this, extending itself over every Part.

We have told the Farmer of the natural Hollows there are on each Side of the Partition of the Nostrils ; and have observed, that Nature, in a State of Health, occasions so little of the natural Liquor of the Kernels to be separated here, that it serves only to moisten the Skin, because if more were separated there, as in other Parts, it could not be discharged, and would be a Burthen to her. This Mischief happens in the Case of the Glanders.

The Kernels in these Cavities are disordered like the rest ; they grow ulcerated, and they discharge a great deal of Matter, which lodges, against the Intent of Nature, in these Hollows, and they are found full of it in a very offensive Con-

dition, on the dissecting the Heads of Horses dead with this Disease.

In the same Manner also, the Kernels which are in that Part of the Skin which lines the Sides of the Hollow in the Forehead-Bone, grow swelled, enlarged, enflamed, and ulcerated; and the Skin itself grows thick, raw, and bloody. All this joins to confirm the Truth of that System, which places the Seat of the Glanders in this Skin, or Lining of the Nostrils and its Glands, and declares it not to be in the Liver or elsewhere; because in all Dissections of Horses dead with the Glanders, this Skin and its Kernels are found thus swelled, inflamed and ulcerated, and the Entrails are, as we have said, at the same Time found perfectly sound and good; unless when the Creature has had some other Malady beside.

These Hollows of the Forehead Bone in Horses dead with the Disorder, are found, like those by the Side of the Partition, full of thick offensive Matter, and the Change in the Skin itself is greater here than in any other Part. In a Horse that has died without the Glanders, this Skin upon Dissection is found to be thin, fine and soft, and there is never seen in it any Blood Vessel: doubtless there are such, though too small to be perceived by the Eye; but in this Case of a Horse dead with the Glanders, the Skin in this Part is thick, hard, and inflamed; and there are Blood Vessels seen all over it, with their Sides and Ends eaten to Pieces. In each Nostril are two Substances rolled up like Horns, and in the same Manner covered with the Skin which covers the Partition, and lines the Cavities; and in this Part this Skin is in the same Manner found to be enflamed, thickened, full of Blood Vessels, and ulcerated.

By this it is plain, that as the Skin we have described is the real Seat of the Glanders, so it is universally affected by that Disease whenever it appears, and no Parts of it escapes.

The Disease first shews itself in those Parts of this Skin where the Kernels are biggest, and this is particularly the Case in the Hollows of the Forehead Bone; so that they may be called in a particular Manner the Seat of the Disorder: but it pursues its Course through the whole Extent of that Membrane.

It is in general much the same Structure that we find upon Dissection in the Head of a Horse, and in that of one of our own Species: but there is a particular Difference in those Glands or Kernels we have mentioned under the Jaw Bone, which one by one swell, as the Disease affects first one, and then the other Nostril.

There

There are the same Glands or Kernels in Men, and Anatomists call them the Sublingual Glands: but it is particular, that in Men they open into the Hollow of the Mouth; so that whatever they discharge is spit out, or otherwise managed as the Spittle: but in Horses they do not open into the Mouth, but turn backwards, and pass behind the Holes of the Nostrils.

The Mouth in Mankind is in a great Degree moistened by these Glands; and to supply that Office in Horses, as these have their opening turned another Way, there are innumerable small Kernels all over the Insides of the Lips. Now though the Kernels we have just named are swelled in the very first Appearance of the Glanders, yet the others within the Lips are not at all affected, the Disease not being concerned with the Mouth, but only with the Glands of the Skin of the Nostrils.

It also appears to be a Disorder solely and particularly of this Skin and its Kernels, for it very rarely spreads to any other Part. In the extreme Degrees of the Disease, the Partition of the Nostrils which is covered by this Skin will be eaten, by the Sharpness of the Humour thus surrounding it on every Side; but no Dissection ever shewed any other Bone to be affected by the Disease.

The Farmer who consults his own Reason upon the Result of all that has been said, will be convinced, in Spite of all that the whole List of his favourite Authors have written, that the Seat of the Glanders is entirely and only in this Skin of the Nostrils, and its Kernels: and he will thence be led to pursue the Cure upon the only rational Plan, the attempting it only in that Place.

If the Liver, the Lungs, or the Brain, or any other of these Parts, were the Seat of the Disease, the Creature must be pining, and disordered in other Respects beside this; and sooner or later would be carried off; whereas we see on the contrary, that this Disorder shews itself on Horses otherwise in perfect good Condition; and that when it has rendered them unfit for better Services, and they are delivered over to Hackney Coachmen, they live a long Time with it, and shew no Sign of any other Distemper. This, and the healthful Appearance of those Parts when the Horse is opened, shew that nothing there has been either the Cause of the Disorder, or has been so much as affected by it.

C H A P. IV. *Of the Causes of the Glanders.*

WE have shewn the Farmer what this Disease is, and shall from that Explanation naturally lead him to the proper and only Method of Cure: but as every thing here is practical, we shall introduce between these Considerations something as to what may be the accidental Cause of it.

The Glanders may arise from a common Cold, as a stuffing up of the Nose in our own Species is the common Effect of the same Accident; and in this Case the first Approaches of the Disorder are to be guarded against, for they may be stopped, and that Mischiefe easily prevented, which it will be, after it should get rooted, very difficult to cure.

Thus, when a Horse has got a Cold, and it falls upon his Nostrils, let the Farmer remember that the Glanders are situated in this Part, and that a cold is their natural Beginning. Let him remember that every Cold which falls upon this Part may settle into that terrible Disorder, and consequently take the first Care to remove it.

He will perceive when a Cold seizes this Part, by the Horse's snorting and frequently tossing about his Head, and afterwards by the Nostrils being more than ordinarily wet.

In this Case nothing is so natural as its turning to the Glanders. If the Horse be in a feverish Disposition at the same Time, the Skin and its Kernels will enflame as well as swell, and all the Symptoms may very naturally follow.

This may give our Husbandman a just Notion of the Danger of a Cold to his Horses: a great Physician, when his Patient told him he had only a Cold, answered, Would you "have the Plague?" and there is the same Reason for considering that Disorder in the most serious Light, when it affects Horses.

If it seize upon the Nose let the Horse be immediately blooded largely: then give him twice in the Day a good warm Mash, and ride him gently afterwards. Keep him warm and clean, and the next Day give him the common Purge.

If this do not answer let him be blooded the Day after, as largely as at first, and pursue the same Course one Day more, and it rarely fails.

I have practised this myself, and I have recommended it to others; and I am certain with the greatest Success, I have all the Reason in the World to believe I have prevented the Glanders in many a Horse; and can say with the greatest Truth

Truth that I never had one, since I have followed this Practice, that has fallen to that Disorder, which I reasonably attribute to taking this Care in Time.

A Cold seizing upon the Nose is not the only Thing that may cause the Glanders. A Surfeit may very naturally take the same Effect. This fouls the Blood, and produces gross Humours in Abundance; and these may very naturally be discharged by the Kernels in this Skin, such being their natural Office. This may swell, inflame, and ulcerate the Skin of the Nostrils, and be an immediate Cause of the Glanders; and in this Way that Disease would probably be more dangerous than any other Way, and more difficult of Remedy.

In this Case however the Method of Cure must be the same, only with this Caution, that Sweetners of the Blood must be given at the same Time. If this Caution should be omitted, the Disorder might break out in the same Place again.

A farther Caution must be given the Farmer, that before he attempts to cure a Horse by the Method to be delivered in the next Chapter, he be assured that the Disorder is what he takes it to be: if he will observe carefully the several Symptoms we have set down, he cannot be deceived; but he must take Care that he do not suppose every Running at a Horse's Nose to be the Glanders; for in that Mistake he may sometimes set about a troublesome and harsh Method of Cure, for a Disorder that would perhaps have gone off of itself, or with a single Bleeding; or he may, in some Cases, attempt to remedy that which is, in its own Nature, incurable; and in the End disgrace the Method, because it would not cure a different Disease.

To explain this more fully, he is to observe the Difference between a Cold settling upon the Nostrils, and the Glanders. We have shewn this may bring on the Glanders, but it is not that Disease itself, and slighter Methods will cure it. On the other hand, an Abscess in the Lungs may discharge itself at the Nostrils of a Horse, and this, though it on a slight Observation resemble the Glanders, yet is altogether distinct in its Nature, Origin, and Situation; and therefore cannot be reached by the proper Cure of that other Disease.

When a Horse runs at the Nose, let the Farmer observe the Nature and Colour of the Matter. If this be sharp, corroding, and ill-coloured, it looks like the Glanders, therefore let him next look into the Inside as far as he can;

and if he perceive the Skin swelled, inflamed, and full of
little

little Sores, there is little Room to doubt of its being this terrible Disorder. Let him next observe whether it runs continually, which if it does it is another Proof; and lastly, let him examine the Horse in all other Respects, and if he find him in every other Circumstance well and healthy, he may conclude with Certainty that this is the Disease, and proceed to the Cure.

On the other Hand, if the Matter be thick and white, and the inner Part of the Nose not inflamed or ulcerated; and if it run very little while he is at rest in the Stable, and increases on his being put to work; and finally, when he has a Difficulty of Breathing, and a rattling in his Breast as he takes his Breath, all these Symptoms considered together, will shew that the Disease is not the Glanders, but an Abscess in the Lungs.

This is a Disorder which the proper Method of Cure for the Glanders cannot reach; therefore it will be vain to try it; and indeed, as nothing can cure such a Malady, it is in vain to attempt any thing for it.

C H A P. V. *Of the Method of Cure for the Glanders.*

WE see that the Glanders is a Collection of Ulcers in the Skin of the Inside of the Nose, and its Glands: this is the whole Fact, and knowing this we may advance rationally to the Cure.

The only Method of effecting this must be by cleansing and freeing the Parts from the Lodgment of this sharp Matter, and the healing of these several Ulcers.

That might be done in the same Manner as external Sores are cleansed and healed, but the Difficulty is how to come at these for the dressing, cleansing and healing them. It is plain this cannot be done by the Nostrils, for there is no Way of getting freely and properly at the Complaint by this Method, therefore the first Thing is to be, to make the Opening to the Place where Nature has not given any. We know now that the principal Seat of the Disease is the Glands or Kernels of this Skin, within the Cavity of the Forehead Bone, and we are to proceed accordingly.

When the Skull is cracked, and beat in by a Fall or Blow in our own Species, the Surgeon cuts a Hole through it in another Place, that he may have Way to come at the depressed Part within. This Operation is very terrible but very safe: it is practised continually, and with Success. What we are ourselves able to endure, certainly this coarser Creature may.

may. On this has been founded the only rational Method ever laid down for the Cure of the Glanders.

A Hole is to be pierced through the Skull of a Horse, in such a Place as is least liable to Inconvenience, and most properly situated for the throwing in proper Liquors to the Seat of the Disorder.

The first Consideration in this Respect is, whether the Glanders be seated only in one Nostril, or whether it have seized on both: if only one be affected, then one such Opening through the Skull will be enough: if both Nostrils be infected with the Disorder, then two such Openings are to be made, one for each.

The Place for this Opening to be made therefore is, on one Side or both Sides the Head. It may be done without the least Inconvenience or Hurt to the Creature, and it will give a free Passage to the necessary Applications. The best Place for the Hole to be opened is at some Distance below the Eye; and there is not the least Danger from the Operation.

In the performing it on the Human Species, if any bad Consequences ever attend it, they are not owing to the cutting a Hole through the Bone, but to the injudicious Hand of the Operator hurting the Brain in doing it. Now in Horses the Brain does not come so low as to the Eyes; and therefore in making two Holes, or more if necessary lower down, there is not the least Danger of any bad Accident.

The Safety of this leading Operation being thus shewn, the Use of it is evident. The proper Liquors for washing and cleaning of the Parts, are to be thrown in at these Openings by a Syringe; and the Holes are to be so made that the Syringe being pointed upwards, the Hollow in the Forehead Bone, which we have shewn to be the great Seat of the Disease, may be thoroughly washed by it. It would be very much to be wished, that the opening could be made just where this Hollow of the Forehead Bone is; but that lies so high that a Farrier might do Mischief. The Brain is situated there for the Part is considerably above the Eyes, and more toward the Middle of the Head, but it will answer every good Purpose of this Method if it be made lower, and the Liquor be thrown up into it. In this Method one Aperture or Hole may be made to answer the Purpose in most Cases, though there will not be the least Disadvantage in making two or more for better Convenience.

Though the Cavity or Hollow in the Forehead Bone lies highest; yet the Hollows we have described before at the
Sides

Sides of the Partition of the Nostrils are the most difficult to be well cleaned. Upon two Principles alone turns the whole Method of Cure in this Case; the first is, that there be a Way by which the Liquor intended for washing and cleansing the Parts can be conveyed to them through a Syringe; and the other is, that when the Matter is thus wash'd off from the Skin and its Kernels, there be a Passage for the Liquor and that foul Matter to go off freely together.

Now in Respect of the Matter lodged in the Hollow of the Forehead Bone, that being wash'd away by the Liquor from the Syringe will very freely and naturally discharge itself, together with that Liquor, out at the Nostrils; but it is not so in the natural State of Things, with Respect to the Matter which fouls the Inside of the Hollows situated at the Sides of the Partitions of the Nose; for we have shewn already that they are so deep and crooked, that there is no Way of getting any thing once lodged there, out of their Bottoms, by the natural Passages.

This incurs the Necessity of another Opening in the Bone, to be made by Art, but as this must be much lower than the other, there can be no Danger in the making it. All below the Eyes in a Horse's Head should be considered as the Bone of the Nose, not the Skull; we understand by Skull the bony Covering of the Brain, and there is no Brain within or near that Part.

Thus the Farmer sees that an Opening in this Place is altogether necessary, and not at all dangerous. It would be in vain to wash off the Matter in these Cavities ever so clean, if, when that were done, a Part of it must of Necessity be left in the Cavity, together with some of the Liquor of the Syringe; but this is easily to be discharged in this Manner.

Upon this Consideration, the very best Place for making this Opening to wash and clean these Cavities, is to pierce through the bony Divisions; and then to open another Hole somewhat lower, to give Passage for all that is wash'd out.

The best Direction for the exact Place of these Holes is, that the Farmer and the Farrier together examine the Skull of a dead Horse. They will there see how these several Cavities are placed, and by that know better than by any formal Directions of Words or Figures, where to make them.

When these Holes are opened, and the Syringe is used, the proper Method is to throw in the Liquor forcibly; and then to stop the Nostril, that it may be forced out at this Hole, by which Means all will be perfectly cleared; and by a Repetition

Repetition of this cleansing, and an Injection of proper Liquors, the Disease will be perfectly and thoroughly cured. This reduces the Glanders to the Condition of an outward Malady, and it is thus to be remedied in the same Manner.

In Case of the Matter, together with the Injection, not coming freely and perfectly out at the lower Opening, nothing more is needful than to make Way for it by thrusting in the Point of any sharp Iron Instrument. It frequently happens that the Bones have a particular Construction in this Part; but when they have it is attended with no farther Difficulty. This Conformation may stop in the Matter, or a Part of it, and the Opening thus made never fails to discharge it. If the Opening made by the Point of the Instrument, should close up before the Time, it may be kept open by burning it with a red hot Iron.

This Method of Cure was proposed in FRANCE, and there very well received; and there is no Question of its Success wherever it shall be introduced. We have shewn the whole Design and Nature of the Operation, and shall in the next Chapter treat of the best Methods of preparing the needful Liquors for injecting.

C H A P. VI. *Of the Liquors to be injected for a Cure of the Glanders.*

WE have now to lay before the Farmer the most proper Liquors for performing the Cure, and these we shall advise to be of three Kinds; the first cleansing alone, the second cleansing and healing, and the third Spirituous and Styptic.

For the first Liquor let him proceed thus: set on three Gallons of Water to boil, and have ready three Pounds of fine Stone Lime new made. When the Water boils pour it into a Pan, large enough to hold three Times the Quantity, and by Degrees put in the Lime. There will be a great swelling and boiling up, and when all is over, and the whole thoroughly cold, the Water will swim clear and transparent at the Top, and the Lime will be settled in a white Powder at the Bottom.

Pour off this clean Liquor, and set it by all Night; then in the Morning there will be a Skin upon it; scum this off and bottle up the clear Water. This is Lime Water of an exact Degree of Strength for the intended Purpose. Let the Farmer be sure not to buy it, but to make it himself in this Manner.

To

To a Quart of this Lime Water put a Quarter of a Pint of Vinegar, and half an Ounce of Basket Salt; let it all melt together, and then it will be fit for Use.

Two Openings being made in the Head of the Horse, let a Pewter Syringe be got, that has a good Strength to throw the Liquor out, and that will hold about half a Pint.

Set on this Quantity of the Liquor just named, to warm; and when it is of such Heat that the Hand can be bore in it ever so long without Pain, it is fit for Use. Hold the Nostrils of the Horse together, and drive in this Liquor carefully and forcibly. It will run out partly at the lower Hole, and partly at the Nostrils, when they are let open, as they should be at a proper Time, when the greatest Part of the Liquor has gone the other Way.

When this Syringe-full has been used in this Manner, heat as much more, and throw it up in the like Way. Then let the Horse rest twelve Hours, after which repeat the same Method exactly.

Morning and Night are the best Times of doing it; and this is to be continued four Days, but with the Use of the second Liquor in the Middle, and at the End of that Time.

The second Liquor is thus prepared. Set a Fire Shovel over a very gentle Fire, and put into it a quarter of an Ounce of green Copperas beat to Powder: stir it about till it becomes a dry grey Dust. Put this into two Quarts of Molasses Spirit; and add a little Scrapings of Oak Galls. Shake this up and set it by all Night. In the Morning it will be black like Ink, and this is a cheap and easy Way of preparing the famous Styptick of HELVETIUS.

Upon the second Day use the Water with the Syringe, at Four o'Clock in the Afternoon, instead of late in the Evening; and, towards Night, warm half a Pint of this black Tincture.

Throw this up with the Syringe in the same Manner as the other; and leave the Horse to his Rest.

The same do on the Evening of the fourth Day, and then prepare the third Liquor.

Powder a Quarter of a Pound of Alum, and add to it the same Quantity of white Vitriol. Put them into a strong Earthen Pipkin, without any Water, and set them over the Fire; they will melt and afterwards dry again.

Then take them off, grind the Whole to Powder, and put it into a large Jar: pour upon it a Gallon of the Lime-Water just directed to be made, stir them well together with a Stick, and leave them all Night.

In the Morning pour off the clear Liquor, leaving the Settlement behind; add to it a Quart of strong Vinegar, and bottle it for Use.

This is to be the Liquor for injecting, after the four first Days.

Every Morning and Evening warm a Pint of this, and carefully throw it up by the Syringe, observing to stop the Nostrils at first, that the greatest Part of the Liquor may each Time run out through the lower Hole in the Face: then let some of it come last of all through the Nostrils; by this Means, every Part of the affected Skin will be washed and cleansed twice a Day by this excellent Liquor; and, by Degrees, the Whole will heal.

Every other Day, instead of Evening, the last Injection of the Water must be performed in the Afternoon, as directed in the preceding Article; and at Night of each of those Days, the Black Tincture is to be injected, as directed before.

This is a plain, rational, and safe Method of Proceeding; and by this Means the Glanders will be perfectly cured, at a very small Expence, and with no great Trouble. Many serviceable Horses will be preserved from the Dogs, or from the meanest Employments, and rendered as valuable as if the Disease had never attacked them.

As to the Time required to perfect a Cure, it will be different, according to the Degree of the Disorder; but, in general, it may be called three Weeks or a Month; the Progress of the Cure will be seen by the Stoppage of the Running; and it will always be adviseable to continue the Injections a Fortnight after the Cure seems perfect, every other or every third Day.

If the Flesh grow fast about the Openings, it must be kept down by a hot Iron; for there must be preserved all the Time a free Passage for the Liquor, both in and out; and if the Horse be otherwise disordered, Brimstone and Antimony are to be mixed and sprinkled over his Provender.

C H A P. VII. *Of Purging a Horse.*

THERE are a great Variety of Occasions on which this Creature may want purging, and many Sorts of Physic may answer the Purpose; but before we come to the Method of preparing any of these, it will be necessary to give the Farmer proper Directions concerning the Use of such Medicines.

A Horse

A Horse must be prepared for a Purge the Day before it is given him, or it will take very little Effect; and then it will operate more or less, according to the Management of him during the Time.

The Day before a Horse is to be purged, give him a good Quantity of Water with scalded Bran in it, and let him have it warm. Keep him quiet, and the next Morning, before he has any thing to eat, give him the Purge. Any one of the following will answer the common Purposes, with little Charge.

1. *A Purge with Aloes.*

Take an Ounce and a Quarter of Horse-Aloes beaten to Powder, and a Quarter of an Ounce of Cream of Tartar, mix these up with an Ounce and a half of fresh Butter, and half an Ounce of Powder of Anniseeds, work this up into a Consistence, and roll it round into two Balls. Rub these over with Butter, and give them to the Horse; they will, by Means of being greased, slip down very freely; and after them give him a Horn of Small Beer made warm.

The Dose is to be made larger or smaller, as the Horse is larger and coarser fed, or finer limb'd, and managed more delicately. There is as much Difference between the Constitution of a Cart-Horse and a Racer, as between a Drayman and a Person of Quality; and they must in all Respects be treated accordingly, not only in the Strength of the Dose, but in the Management afterwards: for what suits one will be quite improper for the other.

2. *A Purge with Jalap.*

Take Powder of Aloes an Ounce, Powder of Jalap a Quarter of an Ounce, and powdered Ginger a Dram: mix all these up with two Ounces of fresh Butter, and make the Whole into a Couple of Balls, or more; grease them on the Outside, and give them to the Horse with some warm Ale afterwards. These are two common Receipts, but they are often ill proportioned in the Quantities; something of this Kind stands under the Name of a Purge for Horses, in most Books that treat of these Things; but the Quantity of the Anniseeds is too great, in the common Directions for the first; and this will make a Horse sick afterwards; and to the other there are commonly added useless Ingredients. These are approved Proportions,

Proportions, and they will answer almost every Occasion there can be for a Horse's being physicked in this Way.

C H A P. VIII. *Of managing a Horse with his Physic.*

WE have directed how a Horse is to be prepared for his Purge, by giving him a proper Drink the Day before : but it is needful we tell the Farmer how he is to conduct him when he has swallowed it.

Let the Balls and the Beer be given him early in the Morning, and let him then be rid out gently for a Quarter of an Hour. Then bring him cool in, and let him be set up two Hours without Food.

After this Time give him a small Quantity of good Hay, and a Quarter of an Hour after that some warm Water.

An Hour after this give him some scalded Bran. He will purge kindly after this Manner of Management ; and after this he should be rid out a little again ; then when he is brought in, he should have some Bran and Water warm, with but a small Quantity of the Water. Then let him be rid out again ; in this Manner a Horse is to be treated with his Purge, and, in general, it will be easy to make it work more or less at Pleasure, by giving him more or less Exercise, and more or less of the Bran and Water.

If the Purge have been too violent, and will not stop, the following Astringent Drink will always stop it.

An astringent Drink.

Boil three Pints of stale Beer, and some Pieces of Crust of brown Bread : to this put an Ounce of Whiting, and a Quarter of an Ounce of Diascordium, made without Honey : if this does not stop it, in four or five Hours, give the same Quantity of Whiting, and double the Quantity of Diascordium, in only one Pint of the Beer and Bread. This will make him altogether quiet and easy, and he will be in his Body as usual.

C H A P. IX. *The Care of a Horse in taking him up from Grass.*

IT is a common Thing, and generally very proper, to purge a Horse when taken up from Grass ; but this must not be done immediately on taking up ; he ought to be kept in the

Stable a Week ; and he should have scalded Bran twice before the Purge.

There must be a great deal of Care taken of a Horse, in general, in the taking him up from Grass, otherwise he will fall into Disorders very difficult to cure. It is much better to prevent them by a timely Care.

He must be dry when taken up from the Pasture, otherwise he will very likely grow scabby.

BARTHOLOMEW-Tide is the latest he should be left out, if of any thing of a tender Make ; for after this Time he will have more Cold and less Nourishment.

The Dews are very nipping after this Season, and the Grass has lost its Strength ; so that partly for Want of Nourishment, and partly for the chilling of his Blood, it is much if he escape some Disorder. Many a Horse has been rendered unserviceable the greatest Part of the Winter, and been an Expence into the Bargain, from the leaving him out a little too long.

It is a very good Method with a delicate Horse, to trim him as soon as he is taken from Grass. To this Purpose, he is to be led out in a fine warm Day, and when he is trim'd, some Soap and a good Quantity of warm Water is to be got ready. He is to be rubbed over with the Soap, taking Care it does not get into his Eyes or Ears, and then washed with the warm Water and some Flannel-Cloths : this is to be done twice over, and he is then to be led into the Stable, and gently rubbed with a Cloth till perfectly dry.

This Cleaning is very comfortable to the Creature, and at the same Time takes off all Sorts of Foulness got at Grass, of which there are many Kinds, not to be met with in the Stable. He is then to be kept a Week or more in the Stable, and purged and blooded. This Course naturally and perfectly reconciles him to the new Method of living, and he falls into no Disorder.

C H A P. X. *For a Cold.*

THIS is a Disorder so well understood, that it cannot be mistaken, nor does it need any Explanation.

Boil in a Quart of Ale three Ounces of fresh Liquorice-Root, beat very fine into Threads. Strain the Liquor off, pressing it hard, and add to it three Drams of Elecampane Powder, one Dram of Powder of Anniseeds, a Quarter of a Pint of Oil, and a Quarter of a Pound of Honey ; mix all well, and give it warm. If it does not take Effect the first Time,

Time, let it be repeated three or four Times, and it seldom fails.

Balls for a Cold of long Standing.

Put into a large Bowl six Pounds of Wheat-Meal, mix with it two Ounces of Powder of Anniseeds, Cummin-seed one Ounce, Linseed three Ounces, Fenugreek-seed one Ounce and a half; stir these well about, then mix half a Pound of Liquorice Powder, and a Quarter of a Pound of Flour of Brimstone, add these to the rest. Lastly, add Bay-berries and Juniper-berries, powdered, three Ounces of each, and the same Quantity of Powder of Elecampane.

When all are well stirred and mixed together, break six Eggs, throw away the Whites, beat up the Yolks with two Quarts of Mountain Wine. Add to this a Pound and a half of Honey, and a Pint of Sallad Oil. Mix all these perfectly well together; then bring in the Powder, and work the Whole to a Paste. If this should be too stiff, a little more Wine must be added; and, if too soft, some Flour must be put in, till the Whole be of such a Consistence that it will conveniently roll into Balls.

These are to be made of the Bigness of a Hen's Egg, but round. This rolling them up is only for the Convenience of keeping; when they are to be used they are to be dissolved. Two is the proper Quantity for a Dose, and they are to be melted in the Creature's Water, Morning and Evening, for fifteen Days.

C H A P. XI. *For the Sleeping Evil.*

THE Sleeping Evil in Horses, is the same that we call the Lethargy in our own Species, and it will be as fatal to them as it is to ourselves, if not remedied in Time. The Cause is their eating a great Quantity of coarse Food, and having less Work than usual.

It shews itself by their being sluggish, and continually sleeping or dozing: the Remedy is the following Ball.

Pound in a Marble Mortar a Handful of the Plant called Wall-Pepper, or sharp Stone-Crop; it is a common creeping Plant upon Walls, and bears yellow Flowers. Put to this a very little White Wine, and squeeze out the Juice. Grind in a Mortar four Ounces of Elecampane Powder, and one Dram of Powder of Pellitory of SPAIN; add the Juice to these, and then put in a Quarter of a Pound of CASTILE Soap, work

and beat all well together; and then put in Liquorice Powder by a little at a time, to bring it to a soft Paste. Keep this in a Pot, and every Morning, before he has taken any Food, give him a Piece of it as big as a large Walnut, greased. Let him drink Milk and Water, warmed, after it, and keep him stirring.

This is a Receipt I have seen try'd many Times, and never once found it fail to make a perfect Cure.

C H A P. XII. *For the Gargle.*

THIS is a Disorder that principally affects the Head and Throat of the Horse, and, if not taken in Time, is very dangerous. It is also unfortunate for the Farmer in another Respect, for it is contagious; and, from one Horse will spread itself through a whole Stable.

It is most dangerous in the Autumn of the Year, and generally attends very dry Seasons, when there being a Scarcity of Water, the Horses are forced to drink what is foul and bad.

I have also known it plainly caused by Horses feeding upon a poor bad Grass in wet Places; where there generally lies Water over the Ground; but it happens to be dry at these Seasons. Some Horses are fond of this filthy Food: I have observed their Chaps all dirted with eating it down to the Stumps; and generally the Gargle has followed.

A Horse that has the Gargle hangs down his Head and is restless: he breathes with Difficulty; his Eyes are gummy, and his Head swells; he rattles in the Throat, and he goes weakly and staggering.

As soon as the Farmer sees this Disorder in a Horse, let him separate the Creature from the Rest; and it will be very proper to bleed them all by Way of Prevention.

Then bleeding the sick Horse more largely than the others, give him the following Drench.

Set on two Quarts of Ale to boil, and as it heats stir in a Dram of Saffron cut small with a Pair of Scissars, and Half an Ounce of Philonium Romanum. Bruise two Heads of Garlick and two good Handfuls of Wormwood, press out the Juice squeezing it very hard, and pour this to the Rest; let it boil a little, and then set it off.

This is for two Doses; if the Horse be very bad, he may have one in the Morning and another at Night; and if not so violently taken, one at Night only will do, keeping him
three

three Hours without Food before, and giving him nothing after it.

Let this be repeated every Day, or every other Day, according to the Degree of the Disorder, for four Times, and let him all the while be kept warm, and give him boiled Oats and ground Malt in a Mash.

C H A P. XIII. *For Roughness of the Coat and Swelling of the Heels.*

WHEN a Horse grows rough in a Stable, in Spite of the usual Care, and his Heels swell, the following Mixture is to be given him with all his Food.

Take a Pound of Flower of Brimstone, half a Pound of Turmerick, and a Quarter of a Pound of Crude Antimony in Powder. Sift these together; by which Means they will be thoroughly mixed, and strew a little of it over and among all his Viſuals.

C H A P. XIV. *For a ravenous Appetite.*

THERE is a Disorder in our own Species, which Doctors call a Canine Appetite, that is an Appetite like a Dog, greedy and devouring every thing, with no Advantage to the Body. Horses are subject to the same, and they will consume more than their due Quantity of Food if it be given them, and still be poor and lean. In this Disorder they swallow their Meat without chewing it. It is much more common than is thought; and we advise all who are concerned with Horses to regard it. They may know it by watching the Horse's Manner of eating, and by observing his Stools.

If he snatches at every thing, and eats greedily and vastly quick, it is a suspicious Circumstance: and if his Food be seen in a Manner entire and unaltered in his Dung, it is a Proof. When Horses have this ravenous Appetite to a great Degree, their Provender will go through them quite unaltered, and they will grow poor and weak till they are useless. In this Case give the following Drench.

Mix together a Gallon of Milk and a Quart of Oil: stir in as much raw Wheat Flour as will mix in without making it too thick for swallowing easily. Give him a good Drench of this every Morning before he tastes any Food, and about half an Hour after offer him some Hay. He will not be so ravenous, though he has eat nothing: give him a moderate Quantity, and then let him be quiet.

When he has been rode out a little, or worked for some Hours, give him some more Hay. He will snatch at it and be ravenous as usual; but let him have only a little at a Time, and let him see no more. This Way feed him to the Fill by a little at a Time, till he will not eat any more; then set a good Quantity before him, but don't let it remain a great while in his Sight.

Repeat this Conduct every Day for a Week, and he will eat like other Horses. I have seen this tried very frequently and successfully.

C H A P. XV. *For the Staggers.*

THIS is a very terrible Disease, and has been fatal to many a stout Creature.

The principal Cause of it is the Carelessness of Servants, in turning a Horse out to Grass while he is hot from Travel or Labour. This gives him a violent Cold, which loads his Head with a tough Phlegm.

A Horse is known to have the Staggers by his tottering, staggering, and going weakly and faintly. His Eyes will be watery, and at first he will thrust his Head into the Litter, and by tossing it up and down shew his great Uneasiness: in the more violent State of the Disease he will beat his Head against the Wall in his Agony.

This is a Disease so dangerous, that it should be watched in the beginning; for it is then much easier cured than afterwards.

The first Thing is to bleed him; and this must be largely. If the Disorder be perceived in Time, a good Bleeding alone is often a Cure. Some advise bleeding in the Flank, but it is of no Consequence in what Part, except in the Head itself; which, if the first Bleeding do not succeed, may be very well done during the Use of the other Remedies.

We see frequently, that a natural Bleeding at the Nose carries off Disorders of the Head in ourselves almost immediately. The Sailors have a Way of bleeding themselves in violent Head-achs, between the Gristles at the End of the Nose, and they find great Relief from it: and Dr. DOVER tried very hard to bring up the Custom of bleeding in the same Part more artfully. I have known it tried sometimes, and always with Success; but neither the Surgeons nor the Patients liked it, so it presently dropped. The Good accruing from this bleeding, though in never so small a Quantity, shews what may be done for a Horse in this terrible Disorder of the Head, the same Way.

Way. The Country Farriers Method of doing it is a very coarse one, but I have seen it succeed well, and great Good arises from it.

They sharpen a tough small Oak Stick, and split it at the End like a Fork. They thrust this up the Horse's Nostrils, and set them bleeding; and this is very successful. It may be done after two Days, if the following Medicines do not take Effect.

Two Hours after the common bleeding give him the following Glyster. Heat two Quarts of Emetick Wine, and dissolve in it a quarter of a Pound of Unguentum Populneum; throw up this as a Glyster and let him rest.

Mean time prepare the following Medicine: boil together two Ounces of Powder of the Scoria of Liver of Antimony and five Pints of strong Beer. When it has boiled five Minutes take it off the Fire: dissolve in it a Quarter of a Pound of Butter.

An Hour after the first Glyster has come away give this in the same Manner, and then walk him gently out in a warm dry Place. Rub his Legs well with Wisps of Straw wetted in some Water, and feed him with Bran and Bread, and warm Water.

Two Hours after the second Glyster has come away, dissolve an Ounce of Venice Treacle in a Pint of White Wine, and give it to him as a Drench: and presently after give him another Glyster thus made.

Boil a double Handful of Mallows Roots and all in two Quarts of Spring Water to a Quart; then add to this when strain'd off two Ounces of Sal Polycrystum, the same Quantity of Venice Treacle, and three Quarters of a Pint of Oil: give this warm, and set him up for Rest.

The next Day let one or other of these Glysters be repeated as Occasion may require; and put into his Ears some pounded Rue, black Hellebore Root and Pepper mixed up with Brandy. Sow up his Ears to keep this in, and let it remain there all Day. Give him the following Drink. Boil in two Quarts of Ale two Ounces of Turmeric, and the same Quantity of Anise Seeds in Powder; add to the strained Liquor a Quarter of a Pint of Brandy and give it for a Drench.

The Disorder is a very severe one; so that it commonly soon terminates either in the Death of the Creature, or in his Recovery from the immediate Danger: but sometimes, though he get soon out of Danger, he recovers slowly. In this Case the Glyster need not be repeated, but he should con-

tinue in a Course of the Drench for some Time, and be kept carefully warm and well rubbed.

There is also a famous Remedy which often assists the others greatly; or sometimes succeeds by itself: it is this.

Dig up a Dock Root and quarter it; cut a Slip of the Thickness of Half a Finger, and an Inch long: spread a Plaister of common Pitch of Half the Breadth of the Palm of the Hand: these two Things being in Readiness, cut a Slit through the Skin to the Bone in the Middle of the Horse's Forehead: lay in the Piece of Dock-Root, and cover it with the Plaister.

If it runs in twelve Hours, the Horse will be likely to recover; if not at all, the Case is desperate. These Methods have recovered many a Horse in my own Stable; and I can therefore recommend them from Experience. Indeed I shall set down here none but such as I have either tried myself, or have been told of from the Experience of People of Credit.

C H A P. XVI. *For the Farcy.*

THE Farcy is not so desperate or violent a Disease as the last described; but it is the most loathsome that can be conceived: it is a creeping Ulcer, that spreads and runs in a most offensive Manner, and is not easily remedied when got to any Height.

The first Appearance of it is in hard Knobs and Lumps; and these spread till they over-run the greatest Part of the Body in this filthy Manner.

It is owing to a disordered State of the Blood from bad Food and unreasonable Fatigues; and when a Horse is in a Condition to receive the Disease, sometimes it will be caught by standing near another that has it. Indeed when the Blood is disposed for it, a very little external Injury will bring it on; the spurring with a rusty Spur, the wounding the Mouth with the Bridle, the galling with the Belt, or any other Hurt.

Often a Horse will itch so in some Part with the Foulness of his Blood, that he will rub till he breaks the Skin, and the Disorder shall begin that Way, and spread quickly. The principal Cause is what we have named, unreasonable Fatigues, and Heats and Colds suddenly upon them: but we must warn the Farmer of one Way of its coming which few are aware of, which is the fattening up a Horse hastily, and taking him from a laborious Life to a quiet Stable.

I have seen this Error frequently made: A Farmer hav-
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ing a Design to part with a Horse, has taken him up to fatten in a Hurry; and instead of answering his Purpose, has given him this Disorder.

It is to be cured most easily when taken in Time; but the Generality of the Country People are so unused to these Considerations, that they don't perceive the Disease till it is at the Height.

I saw a Neighbour JAMES BARNES's Horse in 1738 cured perfectly, when it was taken in Time, in about a Fortnight; and it was done thus: First the Horse was blooded largely in the Neck; then the whole Body of him was carefully looked over, and several of the Knobs were found in different Parts, beside the two or three that were burst.

A Liquor was thus made to rub them. Take Half a Pound of Wood-Soot, and the same Quantity of Soap Lees, boil them up together; put in two Ounces of Allum, and an Ounce of Verdigrease, and a little Water, and stir all well together; then put in a Dram of Powder of Euphorbium, and four Ounces of Powder of white Hellebore Root: let the whole boil up together, and then pour it into a Jar.

Within this the Horse was rubbed in all the Places where the Disease appeared; and at the same Time a good deal of Flower of Brimstone was given him in his Food. The Cure was perfected by this Means, and the Disease never returned.

Another Method is to anoint the Places with Ratsbane mixed up with Butter; and at the same Time give him the following Drench. Take a Handful of the inner Bark of the Elder, the same Quantity of the inner Bark of the Walnut Tree, and the same of Berberry Bark; cut all these small, and put them into two Quarts of strong Beer: let them boil a considerable Time. Near the End of the boiling throw in a Handful of Wall Pepper shred fine. When it has boiled up once or twice with this, strain off the Liquor, pressing it hard.

Put to the strained Liquor a Quarter of an Ounce of Grains of Paradise, and an Ounce of Powder of Turmerick, and give it for one Dose.

This must be repeated every Day as long as the outward Remedy is used; and the best Management of the Horse during such a Cure, is to give him moderate Exercise and moderate Food: any Extream is equally wrong.

When the Disease is in its worst State, the Sores will not give Way to any of these Applications. They must be burnt with a hot Iron, and then the same Course followed that has been directed already: for the same Remedies that would

would take no Effect before, will answer the Purpose after the Effect of the hot Iron.

C H A P. XVII. *Of the Malanders.*

THIS is another external Disorder of a Horse very painful and troublesome, and very difficult of Cure; inso-much that some say nothing more is to be attempted than to alleviate the Pain; and that it is dangerous to stop the Distemper.

This is a very unhappy Error; for there is no Degree of the Malanders but may be cured by proper Management; and that with perfect Safety.

This Disease shews itself on the fore Legs, upon the inner Part just against the bending of the Knee.

It is not a Knob or Ulcer like the Farcy, but a hard, dry, flat Scab, of which sometimes there is only one great one, sometimes several smaller, and these are cracked and chopped upon the Surface, and have stiff Hairs like Bristles growing upon them.

This is the whole of the Disorder: it sometimes is very violent and inveterate, sometimes more slight. When it is very bad it makes the Horse halt; and when least, it occasions him to go stiff till warmed with Exercise.

The general Cause of the Malanders is bad Management. It is the common Disorder of Horses kept in a slovenly Manner, and much more rarely affects those which are managed more carefully.

Those Horses are most subject to it which have most Hair upon their Legs; and they are the difficultest of Cure.

One essential Difference the Farmer is to make in his Conduct, for a Horse under this Disorder, which arises from this Consideration, that sometimes the Malander is only a Soreness in the Part, while the Horse is otherwise in Health; sometimes the Blood is corrupt and bad, and in this Case the Disorder is more violent in its Degree, and more difficult to be cured.

When the Malander is only the Effect of Carelessness, and 'tis upon a Horse otherwise healthful, the Method to be observed is this.

Let him be kept to his usual Work and usual Food, and let the following Wash be made for the Part. Set on a Saucepan with three Quarts of Water, put to it half a Pound of Fenugreek Seed bruised, and a Pound of fresh Marshmallow Root cut in Slices. Boil all this till it is like a Jelly, strain it off hot and press it hard out, then add to the thick Liquor half a Pound of Opodeldock Ointment. Make some of this hot
Morning

Morning and Night, and dipping Flannels in it, wrap them round the Leg where the Complaint is, as hot as the Hand can bear to touch them. Let this be several Times repeated; and at the last of all, wet some of the Ingredients, which must be saved when the Liquor has been pressed out, with some of the Liquor hot, and lay them upon one Flannel, cover them with another, and wrap the whole round each Leg, tying it round so as to keep it on, but not tight.

Let this be done every Day twice, as directed, till the hard Substances begin to soften; after this once in four and twenty Hours will do; and there will thus be a perfect Cure.

Before the first Dressing let the Hair be clip'd round about the Place, and the whole Part about the Malanders wash'd clean with warm Soap Suds. Let this be repeated at Times during the Cure; and after it is perfected, let the Legs be kept very clean in this Part, for fear of its returning.

In this Manner a Horse will be cured very easily, and very certainly, that has no Taint in his Blood: but if there be that added to the outward Malady, Care must be taken accordingly, by giving inward Medicines at the same Time.

When this is the Case the Owner will perceive it by his Habit of Body; and by the outward Remedy not taking its desired and natural Effect, he is then to proceed thus.

Let a Pound of crude Antimony in Powder be mixed with four Pounds of Flowers of Brimstone; and let some of this be sprinkled among all his Food. This is better in such a Case than giving it in Balls or Drenches, for he takes it with his Nourishment a little at a Time, and often; and, accompanying the Food in its Passage through the Intestines, its Virtue goes into the Blood, together with the nutritive Part of the Food.

I have heard many who should know something better than the Vulgar, say that they would not cure a Horse of the Malanders if they could, for all that is prudent is to keep him from growing lame with them. They have an old Proverb that has misled them from Father to Son for many Generations, which is, That curing the Malanders is shutting up the Wolf in the Sheep Cot. But they may be sure of this, not only in the present Case, but in all others whatever, that there will be no Danger or Damage in curing any outward Disorder, when the Blood is at the same Time rectified within.

We have shewn the Difference already, that when the Complaint is only external, outward Remedies alone may be trusted, but when the Blood is affected inward Things must be

be given to assist. The Danger even of a Mistake in these Cases, is not so great as these Persons apprehend; for when the Blood is in Fault, and no Care has been taken to amend it in the Cure, the common Consequence is only, that it breaks out again.

C H A P. XVIII. *For Over-weariness.*

WHEN a Horse has been inconsiderately rode or worked; and no right Care taken to recruit Nature by good Food or Rest, he will be jaded, poor, dispirited, and ill-looking; and in wrong Hands may be utterly lost or spoiled. In this Case he will not eat at all, or not enough; or when he is brought to that his Food will do him little Service. In this Exigence Recourse must be had to Medicines, before he will have any real Benefit from his Provender; and what I have found to answer this Purpose, better than any other Preparation, is the following Drench. Mix in half a Pint of white Wine half an Ounce of Venice Treacle, and half a Dram of Powder of Saffron; give him this every Night for four Times. It will warm and strengthen Nature in every Part; he will recruit in Strength and Spirit during the Night, and rising in the Morning from a good Rest he will eat freely and heartily.

He must have choice Food, clean soft Water, and gentle Exercise, and less than a Week will recover him.

C H A P. XIX. *For inward Heat.*

IT may always be perceived that a Horse is out of Order by his own Uneasiness. If he be restless and faint, without any seeming Cause, and if, upon putting a Hand in his Mouth, his Breath is found to be hot, and his Palate and Tongue inflamed, give him the following.

Mix together a Pint of new Milk, two Ounces of Honey, three Ounces of sweet Oil, and half a Scruple of Salt Prunella. Give him this every Morning, and keep him an Hour after without Food, repeat it till he is recovered. Three Doses usually perfect the Business, if not he may take more.

C H A P. XX. *For a scurfy Skin.*

ALL Creatures are liable to Foulness of the Skin, when they are not taken good Care of: this is sometimes attended with other Disorders, sometimes not.

When

When there is no other Complaint joined with it, the Remedies are to be only external. Then proceed as follows.

Make some very strong Soap Suds, and put in some Vinegar, and some Powder of white Hellebore.

First clean the Horse well dry; then rub him all over with a Brush, wet with the Soap Suds, and then wash him all over with the same, by throwing some over him, working it in with the Hands and rubbing with a coarse Cloath.

After this let him be taken in and dried thoroughly, and give him some Food and clean Litter.

Mix up a Pound of Flower of Brimstone, a quarter of a Pint of Oil of Turpentine, and as much Hog's Lard as will make the whole into an Ointment. Rub him well with this an Hour after he is thoroughly dry from the washing.

The next Day boil a quarter of a Pound of white Hellebore, and a Pound of Dock Root, in a Gallon and half of Water. Make this into Suds, by beating it up with a good Quantity of Soap, and wash him with it. Then anoint him with the same Ointment as before.

Repeat this every Day for seven, eight, or nine Days, according to the Nature of the Complaint, and he will be cured: last of all wash him well with the Suds, without anointing him after it.

This is certain to prove a Cure, if there be nothing but the outward Complaint: but when it has proceeded from bad Food, bad Water, and ill Management, as well as Uncleanliness, then the same outward Method is to be used; and he is to have Flower of Brimstone and Powder of Antimony inwardly, as we ordered in the last Receipt.

There is no Need to alter the Medicines when the Design is the same, and there is no Way so good of giving them. All external Foulnesses are to be cured with Ease and Certainty; and in a very little Time in this Manner.

C H A P. XXI. *For sore Heels.*

SET on an Earthen Pipkin, with a Quart of fresh Urine. Put to this an Ounce of Roman Vitriol, and four Ounces of green Copperas; let these melt, and then put in the Gall of an Ox, and a quarter of an Ounce of Oil of Vitriol. Rub the fore Part gently with this every Morning and Night till it is well.

Then wash it very clean with Soap Suds, and keep it clean from time to time for Fear of a Return.

If

If there be a great Running from the Part after the first two Days, put in a quarter of a Pound of Allum to the Liquor.

For a Cold caught at Grass.

This is not dangerous in itself, but ill Management may bring it to be fixed, and to have the worst Consequence. Timely Care soon remedies it; and the proper Course is this. Set on a Pipkin with a Pint of Ale, and half an Ounce of Liquorice Juice, commonly called Spanish Liquorice. Stir it about, and when the Liquorice is thoroughly dissolved take the Horse up, and give it to him early in the Morning: ride him half an Hour softly after this; and then turn him out.

Repeat this every Day till he is cured, which is generally in a Week.

C H A P. XXII. *For the Cholick.*

THE Horses which are kept with great Care are less subject to the Cholick than others; but none are exempt from it entirely: it is a very common Complaint in the Farmer's Stable; and when it is not properly managed in Time, will frequently be attended with very bad Consequences.

The most usual Cause of this Disorder is the feeding upon coarse green Food: let the Farmer therefore, when he perceives this Disease coming on, change the Food of the Horse; and give him some warm Bran and Water, with a few Drops of Oil of Juniper.

Often this alone proves a perfect Remedy; but when it does not answer Expectation let the Farmer lose no Time, but give him the following Glyster.

Boil two Handfulls of Mallow Leaves, Stalks, and Roots together in three Quarts of Water, till it comes to two Quarts, then strain it off. Set on the clear Water again, with a quarter of a Pound of Caraway Seeds; and a quarter of a Pound of brown Sugar, let it boil up two or three Times, then strain it off, and add to it a quarter of a Pint of sweet Oil, and a Spoonful of Oil of Turpentine. Let this be given as a Glyster and walk him after it.

Two Hours after this is come away give him three Drams of Philonium Romanum, dissolved in a Pint of warm Water, as a Drench. This very seldom fails.

If it does not answer by the next Morning, repeat the Dose. Keep him from bad Food, and give him warm Water with some Bran to drink, and he will perfectly recover.

C H A P. XXIII. *For the Convulsions in the Bowels.*

THIS is a Name by which the Farriers and others concerned in Horses express a Degree of the Cholick much worse than the preceding, and often very dangerous.

The Farmer will know it by these Signs. The Horse stretches out his Legs, his Neck, and his Belly at Times; he rubs himself against the Walls; stamps upon the Ground violently with his Feet; and lies down and gets up again many Times together. His Belly looks swelled, and in the Beginning of the Disorder his Mouth is very hot; afterwards it is cold, and then he is in great Danger.

First bleed him moderately; then give him the same Glyster as last directed, only adding to it a quarter of a Pint of Gin.

Diffolve one Dram of Philonium Romanum, in half a Pint of Mountain Wine: add to this a quarter of a Pint of sweet Oil, and two Tea Spoonfuls of Spirits of Hartshorn; give him this as a Drench, and ride him or walk him softly after it.

If this does not answer in three Hours. Grate a couple of Nutmegs, put them into a quarter of a Pint of Gin: add a quarter of a Pint of sweet Oil, and one Dram of Powder of Saffron.

Give him this and walk him softly.

If there be no Amendment repeat the Glyster.

Then give him these two Drenches alternately once in four Hours, till he is well. I have seen more than one Horse lost by this Disease for want of Care, but never knew this fail.

C H A P. XXIV. *For Cracks about the Feet.*

WHEN this Disorder is taken in the Beginning, it may be very well cured by the Method we have already directed for the Cure of sore Heels; but when it comes to an inveterate Height, and the Cracks are deep, and their Edges hard, it is to be treated in a different Manner, and great Care must be taken or there will be no sound Cure.

To this Purpose, boil together a good Quantity of Marsh-mallow Roots and Bran in some Water, and straining this off
beat

beat it up to a thick Lather with Soap. Let the Heels all about the Cracks be thoroughly soaked and washed with this, and then dry them.

Make the following Ointment. Set on an earthen Pipkin with a quarter of a Pound of Hog's Lard, and the same Quantity of Venice Turpentine. When they are melted throw in half an Ounce of Bees-wax sliced thin, and when that is melted, dust in half an Ounce of powdered Verdigrise. Stir it all very well together; and when it is mixed take it from the Fire, and stir it now and then till it is cold, that the whole may unite thoroughly.

When the Heels are dry from the washing, anoint them very thoroughly and very carefully with this, both on the Edges and within: then spread some of it upon Leather, and wrap round the Heels. Let this be kept on by tying, and not removed till the next Morning: then let the whole Dressing be repeated as at first, washing, anointing, and covering them up. Let this be repeated every Day, and there will be a speedy Amendment, and in some Time a lasting Cure.

C H A P. XXV. *For swelled Heels.*

THIS is an Accident to which many Horses are liable that are kept in Stables, when they have no other Complaint whatsoever. Bleeding is serviceable, and it is no Way so well performed as by Leeches upon the Part.

For this Purpose there is no Need of that Trouble that is taken in bleeding our own Species this Way, for Nature will teach the Leeches to do it. In a Morning let the Horse be led into a Pond that is shallow, and has a good many of them in it. Let him be kept standing there some little Time, and there will a good many of them fasten on him of themselves. There let them take their Chance: they will presently make a good Bleeding, and the Horse will soon recover without any farther Trouble or Concern.

C H A P. XXVI. *For a Strain.*

DISSOLVE two Ounces of Castile Soap in as much Spirit of Wine as will do to melt it: the Soap must be cut into thin Slices, and put into a Jar with the Spirit of Wine, and set in a warm Place. When this is dissolved put in Half an Ounce of Camphire; that will melt presently, and then the whole will be fit for Use: it is a Kind of Opopondiodock, and will answer all its Purposes. Let the strained
Part

Part be rubbed with it very well with a warm Hand every Night and Morning, till the Cure is compleated.

C H A P. XXVII. *For running Eyes.*

THE Eyes of Horses are the Seat of many Distempers; some of them very difficult to be removed, and some requiring the manual Operation of the Farrier: but there are others less violent, that yet are troublesome; and may, if not taken into timely Consideration, grow to Danger: this of Running is one of those, which may always be cured by the timely Use of the following Water.

Take four Handfuls of Ground-Ivy, cut it small, and then beat it in a Marble Mortar.

Boil six Eggs hard, chop the White to Pieces and put to the Ground-Ivy, then beat them again.

Then put in Half a Pint of Mountain-Wine, and a Quarter of a Pint of Rose-Water; and add an Ounce and Half of White Vitrol, and the same Quantity of White Sugar Candy first beat to Powder in another Mortar. Beat all these well together, and then put them into an earthen Pan. Strew some Basket Salt, about an Ounce, over them, and covering the Pan set it in a Cellar to remain six Hours.

Then make a Bag of thin Flannel like a Jelly-Bag, hang it up and set a Pan under it. Pour in all that is in the Pan, and there let it remain till the whole Liquor is gone through without squeezing.

Put this up in a Bottle, and every Morning and Evening drop some of it into the Horse's Eyes, and rub them gently with it, dipping the End of a soft Feather into it for that Purpose. In a few Days it will make a Cure.

C H A P. XXVIII. *For a Film growing on the Eyes.*

BOIL an Egg hard, separate the Yolk and chop the White to Pieces. Mix with it some Basket Salt, and put it into the Shell of another Egg that can be kept whole, and set it over the Fire. Let it stand till it will come to a Powder.

Mix this with two Ounces of Honey and three Grains of White Vitriol in Powder. Put this a little at a Time into the Eye with a Feather, and it will often make a perfect Cure.

This must be done as soon as the Disease shews itself; for it is not to be depended upon afterwards.

C H A P. XXIX. *For Cramps.*

HORSES are subject to Cramps as well as we; and they are very painful. They are discovered by the Creature's Uneasiness, and by the drawing up of his Limbs: the Cure is this:

Put into a large Bottle a Pint and Half of Vinegar and a Pint of Oil; shake them well together; then wet a Woollen Cloth well with them and wrap it round the Limb. If the Cramp do not go off before this is dry, repeat the same Thing, wetting the Cloth well again, and it rarely fails to compleat the Cure.

C H A P. XXX. *For the Anticor.*

THIS is a Pain in the Breast of a Horse, often very troublesome, and frequently the Fore-runner of Danger. It rises from the eating too great a Quantity of rich fresh Food: as when a Horse has been turned loose at once into a Clover Field and left to himself, or the like: the Cure is this:

First bleed him moderately; and then give him the Aloe Purge we have before directed. If he is not much better let him be blooded again the Day after, and the Purge repeated, as there may be Occasion, and all the Time let him have moderate wholesome Diet, and some Exercise.

This Disorder in Horses is very like a Surfeit in our own Species, and is to be cured in the same Manner: nothing is required but cooling and opening the Body: and if it be not done the Disorder will gather Strength, and much worse will follow.

The Farmer will easily know by the Horse's going, and his Motions of various Kinds, whether he is growing worse or better after the first Dose and the first Bleeding. If he faulter in his Legs, and have a Stiffness in his Neck that he can scarce bow it down, all is going wrong: if he take frequent Tremblings, it is worse: the Bleeding must then be repeated immediately, and the Purge be given every other Day till he is well. The Quantity of Blood lost at two, three, or four Bleedings upon such an Occasion, will never do the Creature any Harm; and the Cure entirely depends on it.

C H A P. XXXI. *For Sickneſs at the Stomach.*

THIS Diſorder is uſually owing to a great deal of Provender, or to the eating freſh Meat too careleſſly. I have ſeen a Horſe from an over-feeding upon Clover caſt up all he takes both of Food and Water; and in this Manner he will go on to his Deſtruction, if not timely remedied. The Cure is this:

Make a Quart of Ale hot, and diſſolve in it Half an Ounce of Venice Treacle, a Quarter of an Ounce of Philonium Romanum, and a Dram of Powdered Cinamon. Give him this as a Drench; and, if it ſtays upon his Stomach, give him an Hour afterwards a Feeding by Hand of ſmall Bits of Bread, and a very little Lock of Hay between them. This will continue upon his Stomach, and he will recover.

If the Drench did not ſtay upon his Stomach, give him the following: Heat half a Pint of Red Port Wine with a Lump of Sugar: put into a Baſon three Drams of Salt of Wormwood, ſqueeze in four Lemons, and ſtir it about till the Salt is diſſolved: then when the Wine is boiling hot ſtrain this to it, and give it him for a Drench. This will be ſure to ſtay upon his Stomach, if the other does not; and afterwards he is to be fed as before directed.

C H A P. XXXII. *For the Yellows.*

THIS is a Diſorder ariſing from an overflowing of the Gall, and it may be called the Jaundice in Horſes; for it ariſes from the ſame Cauſe as that Diſeaſe in our own Species; and is to be cured by the ſame Kind of Medicines.

This Diſorder firſt ſhews itſelf by a Yellowneſs in the Whites of the Horſe's Eyes. Then the Skin of the under Part of his upper Lip next to his fore Teeth is tinged yellow; and then he grows faint and unable to perform his Buſineſs. He will fall down as he is in the Stable, be covered with Sweat as he ſtands ſtill, and often ſhiver.

In this Caſe beat in a Mortar a Hat Crown full of freſh Celandine; add to this four Ounces of Powder of Turmerick and a Pint of White Wine. When all is well beat together preſs out the Juice, and put to it in a large Bottle one Dram of Powder of Saffron, and the clear Juice of four Lemons. Shake all well together.

Bleed the Horſe in the Neck moderately; and an Hour after give him for a Drench a Pint of hot Ale and a Quarter

of a Pint of this Mixture. Let the same be repeated every Night and Morning till he is perfectly recovered; giving him moderate Exercise.

C H A P. XXXIII. *For the swelling of the Spleen.*

THIS is a Disorder which renders a Horse feeble and untractable: he faints in the Stable, loaths his Food at some times, and snatches at it voraciously at others; and he is frequently looking to his left Side, lying down upon it, and rubbing it against any thing.

The Remedy for this is to be sought in the Fields: the Herb Agrimony is a certain Cure: but it must be taken for some Time. The Disorder rises from an Obstruction in the Spleen, according to its Name; and this Herb is a certain Cure for all Complaints of that Kind.

Gather a good Quantity of this Plant fresh out of the Fields, and cut off the tender Tops. Beat these in a Mortar, and add a little Sugar, make them into a Conserve, and set this by.

Then pound the rest of the Plant, and mix some Beer with it by Degrees as it is beating: and when it is all a Mash press out the Juice.

Roll up a Ball of the Conserve, and rubbing it over with Butter give it to the Horse in the Manner of a Pill. After it give him Half a Pint of the Juice pressed out as before directed and made warm.

Let this be repeated every Morning and Night; and give him moderate Food and good Exercise. He will not be able to bear the Exercise well at first, but he will do better daily; and by that it will be seen that he is growing well: the Course must be continued till he is quite recovered; which will be known by his leaving off rubbing and looking at his left Side.

C H A P. XXXIV. *For the Heat of Urine.*

THIS is a Disorder in a Horse, the same with the Strangury in our own Species; but it is to be cured more easily if taken in Time. I have observed it very often in Autumn, and scarce at all any other Season of the Year; and I am convinced it is owing to certain Insects the Cattle of many Kinds eat at that Time, in cropping the young Shoots of Trees, Shrubs and Hedges.

Every

Every one knows that the taking of the smallest Quantity of the Drug called Cantharides or Spanish Flies, occasions a terrible Stoppage and Heat of Urine. Cantharides are a Kind of green Beetles found upon the Bushes in SPAIN, and we have the very same Kind, but smaller, in ENGLAND. They live among the young Shoots of Trees at that Season, and now and then are swallowed up by the Horses that crop them: in this Case a Heat of Urine comes on, and the Horse is in terrible Pain: the Part swells and inflames, and he is continually wanting to make water, though he can make only a Drop or two. His Blood is enflamed at the same Time; and if due Care be not taken, the Consequences will be dangerous.

Chop to Pieces four Pounds of the Roots of Fennel, six Pounds of the Roots of Mallows, and two Pounds of the Roots of Parsley. Set them on to boil in a Copper with eight Gallons of Water, and put in three Pounds of French Barley. Let them boil heartily together for half an Hour, stirring them well about: then when the whole is a little cooled, strain off the Liquor, and squeeze it hard from the Ingredients.

Give the Horse equal Quantities of this Liquor and Milk mixed together warm for his Drink; and let him drink as much of it and as often as he will.

The Heat of his Blood will make him thirsty, and the Quantity of this Liquor he swallows will soon be a Cure.

If the same Disorder happen at any other Time of the Year, and from any other Cause, this Medicine will also cure it.

C H A P. XXXV. *For Difficulty of Urine.*

THIS is a Disorder the Farmer must be careful not to confound with the other; for they somewhat resemble one another, though they have different Causes, and require a different Method of Cure.

The former is an Inflammation of the urinary Parts; but this is only an Obstruction by Gravel.

It is seen by the Creature's straining very hard to void his Urine, and often without being able to make any. In this Case let the Part be examined; and if there be no Heat or Inflammation, it is a Sign this is the Case. Also if the Disease be of more Continuance, and if the Horse can sometimes void a great deal; all these are Signs it is an Obstruction, and not an Inflammation; and the Farmer being sure of this by the Symptoms, is to proceed thus.

Let him boil a large Quantity of French Barley in Water, and mix the Liquor with all the Water he drinks; and let

him give every Morning the following Drench. Take Juice of Arsmart and Parsley-pert, of each a quarter of a Pint; Sweet Oil six Spoonfuls, and Oil of Turpentine half a Spoonful: give it warm, and an Hour after let him drink plentifully.

C H A P. XXXVI. *For bloody Urine.*

THIS is a Disorder that shews itself very evidently; so there can be no Mistake of its Nature.

It is generally owing to over-working; and this will oftenest be the Consequence, when with a great deal of Work the Creature is fed poorly.

The Remedy is this.

Bruise a large Quantity of that wild Cranesbill, which is called Herb Robert: squeeze out the Juice, and add to every Pint of it half a Dram of Allum powdered, and two Drams of Dragon's Blood. Give half a Pint twice a Day till he is well.

C H A P. XXXVII. *For the Vives.*

THIS Disorder is a Swelling in the Kernels, between the Chap and the Neck of a Horse. It generally proceeds from Cold; and when it is attended with much Inflammation may be dangerous. The Remedy is this.

Bleed him largely, and pour into his Ears Juice of Rue mixed with a good Quantity of Pepper. Tie the Ears round to keep it in; and if he be not better the next Day repeat the Bleeding, and afterwards give him the common Purge set down before.

C H A P. XXXVIII. *For Soreness in the Nostrils.*

THIS is a Disorder that is very troublesome to Horses kept at Grass; and they are found to be most subject to it which are fed in low wet Grounds. It is to be cured by an outward Application in this Manner.

Bruise some Plantain and press out the Juice. To a Pint of this put a Pint and a Quarter of Vinegar, and two Drams of Alum. Mix all very well together; and first wash the Part clean: then anoint and rub it gently with this Liquor. Repeat this every Day once or twice; and if it do not take speedy Effect, put in more of the Allum: according to the Nature of the Disorder more or less will be required: but this is generally sufficient.

C H A P. XXXIX. *For bleeding at the Nose.*

THIS is an Accident to which Horses are liable, in the same Manner as our own Species; but it is usually much more violent in them than in us. It is to be treated according to the Degree of it in a different Manner.

If it be very violent the Horse must be immediately blooded in the Flank, and while he is bleeding the following Mixture is to be prepared. Bruise in a Mortar equal Quantities of Clown's Allheal and Wood Betony, add to it a little Salt, a little Allum, and some Colcothar of Vitriol; when all is beat together thrust some of it up the Nostril that bleeds, and keep it firmly to the Place till it is stopped.

As there may be Danger of its breaking out again in the Night, there should be a Quantity of the same Mixture thrust up in the Evening, and by Means of a Bandage properly made, it should be kept in.

When the Occasion is less violent the Bleeding may be trusted alone; and when most slight of all, the Herbs pounded, without any Addition, will answer the Purpose.

C H A P. XL. *Of Disorders of the Mouth.*

A Horse is subject to various Disorders of the Mouth, which are known by different Names, and some of these require the Hand of the Farrier; but the greater Part may be cured by the Farmer himself.

The Growth of bad Flesh over the Gums, which is called the Lampas, is to be remedied by burning with a red hot Iron, and for this the Smith or Farrier is fittest, because Practice is the best Director. But for those Cracks and Warts in the Palate, and all the little Pustules and Inflammations to which it is liable, the Remedy is this. Gather a good Quantity of fresh Leaves of Wormwood, stamp them and press out the Juice, mix an equal Part of this and of Ægyptian Ointment, and stir these well together; then, with a Piece of Rag tied to the End of the Skewer, rub over the several Parts that are sore, and they will be cured in a few Times dressing. Swellings under the Tongue, are cured in this Manner.

C H A P. XLI. *For loose Teeth.*

IT sometimes happens that the Teeth of a Horse will be sore, so that he cannot chew his Meat, and at Times they will

be loose ; these are great Inconveniences, and must be remedied so far as may be, as soon as they are perceived. For this Soreness in the Teeth use the following Wash.

Gather some Leaves of Wood Betony, and boil them in Ale till it be very strong of them : then strain it off, and mix with it an equal Quantity of the sharpest Vinegar. Heat this as hot as can be well borne, and wash the Gums about the Roots of the Teeth with it every Night and Morning : at the same Time feed the Horse for some Days with the softest Food that may be, and then leave him to his common Life again.

This generally proves a Remedy for Soreness of the Gums ; but when the Teeth come to be loose the Case is much worse. In this Situation, after the Gums have been well washed with the Liquor before directed, bring in some fresh Leaves of Elecampane, and rub the Teeth and Gums with them : sometimes this will take Effect. Let the Horse be blooded, and let him be fed for some Days with soft Meat, as boiled Oats, and the like Things : for the not forcing them is a very great Article in the Cure.

C H A P. XLII. *For Foundring.*

EVERY one who is at all accustomed to Horses knows this terrible Complaint. The Cause of it is commonly hard Service and bad Management ; from these joined together the Creature gets a Disorder in the Feet, so that he is hardly able to stand upon them. He will quake and totter, and will be scarce able to keep up in going.

This is the Nature of foundering, and the Farmer should have a particular Care of those Things which occasion it. The setting up a Horse when very hot in a cold Stable without Litter is one Cause. The riding him into shallow Water, and letting him stand with his Feet under it a considerable Time, when very hot, is another ; and many other careless Tricks of the same Kind may have a like Effect.

But besides these there are other Accidents that will occasion it : as the wearing strait Shoes, and travelling a great deal upon very rough and hard Ground.

Sometimes a Horse is foundered on all his Feet, which commonly happens from the standing in Water when hot, or some such Accident ; but more usually he is foundered only on his fore Feet : sometimes the Foundering is only on the hinder Feet ; but this is much less common.

When

When he is foundered on the fore Feet he rests upon the hinder ones as much as possible, and is careful how the fore Feet go to the Ground: and in the same Manner, when the hinder Feet are affected, he rests himself almost entirely on the fore; not letting them come down hard at any Time. This Complaint is also known by his seeming weak behind as he goes.

The Method of Cure is this. Let the Horse be taken to a careful Farrier as can be found, and let the Owner stand over him to see his Operations. He is to pare away the Hoof gently till he comes to the Quick, and then to bleed the Foot in four or five Places at what they call the Toes. This being done, put into an earthen Pipkin equal Quantities of Tallow and yellow Rosin; let them melt together perfectly: then lay on a Quantity of this upon every Part whence the Blood came.

This done, let hollow Shoes be put on; and let another Pipkin be set on with equal Quantities of Tallow and Tar; when these are well melted together put in some Bran, and stir all again. Then make this very hot, and stop the Hollows of the Shoes with this.

Let this be repeated every Day for eight Days, during which Time keep him quiet and give him moderate Food.

After this bring him to more Exercise by Degrees.

Sometimes this Method will make a Cure, but not always; for there are Stages of this Disorder which nothing can relieve.

C H A P. XLIII. *For Wind-Galls.*

WIND-GALLS are a Disorder of the Feet, brought on by travelling long together in hard Ways. They are little soft Swellings containing a Kind of Jelly, and appearing on each Side of the Fetlocks. The Remedy is very short and easy. They must be opened to let out the Matter, and then dressed with a Piece of black Pitch spread upon Leather, by Way of Plaister.

The common Practice is to prick them with a Nail, or some such Thing; and this is directed in those Books which treat of these Complaints: but this is a very injudicious Practice. Let the Farmer in all these Cases follow the Practice of the Surgeons; for the Business to be done is just of the same Nature, and they have best studied how to perform it. When they are called to open a Swelling, they do not perform this by pricking it, or making a small Hole for the Matter to come out; but they cut it with their Lancet all the Length;

Length; and sometimes again cross-wise: this lets out all the Matter, and gives the Dressing its full Power. In the same Manner in these Wind-Galls, and all Complaints of the like Nature, let the Farmer open the Swelling from Top to the Bottom; and when the Matter is fully and entirely out, then put on the Dressing. In this Case the whole Malady is remedied at once; for the Horse is well by that Time the Plaisters come off, which they will of themselves in a few Days.

I have heard Farmers complain of these Wind-Galls returning again and again after pricking; and in this Case they will disorder the Feet of a Horse at length to his Destruction; but it is all owing to this Method of pricking instead of lancing: in that Case all being cleared there is no Fear of a Return; but when the Swelling is only pricked a Part of the Matter is left behind; the Hole presently fills up, and then there is a fresh Gathering; and this as often as it is discharged in that wrong Manner.

C H A P. XLIV. *Of the Anbury.*

THIS is a Kind of Swelling or Pustule, that appears like a bloody Wart upon different Parts of the Body of a Horse, and is owing to Accident, without any Distemperature in the Blood. The Cure is this.

Bruise some Plantain Leaves, and press out their Juice. Mix together three Spoonfuls of this, three of Vinegar, and two of Honey; and stir in half an Ounce of powdered Alum. Burn down the Wart with a red hot Iron, close and even to the Body, and then anoint it with some of this Mixture. Repeat this anointing Night and Morning till it is well, and it will never return.

This is a sure Method when there is no Disorder in the Blood; but as this Distemper is sometimes attended with a bad State of the whole Mass, a further Caution is then necessary. The Farmer may be satisfied nothing more is amiss, if the Anbury is perfectly and soon cured by this Method, and does not appear again in other Places, and if the Horse appear clean and healthy; but if the Complaint rises in one Place, when it is cured in another; and especially if at the same Time the Creature be gross, full of foul Humours, and have other Disorders upon the Skin, then there must be Care taken of the whole Mass, as well as of these single Eruptions.

In this Case let the Horse be first blooded; then let the several Anburies be burnt down and dressed in the Manner

we have directed, and let there be Flower of Brimstone and crude Antimony in Powder sprinkled amongst all his Food.

During this let the Owner watch the Appearance of others breaking out; and always burn them down as they come. By this Method there will be a perfect and lasting Cure,

C H A P. XLV. *For a general Decay.*

Sometimes a Horse will fall into a general Decay, without any apparent Cause: he will be weak and faint, and his Coat will grow rough, and he will lose his Flesh till he seem dying and irrecoverable. This is to be remedy'd, if taken in Time, by the following Medicine:

Take six Pounds of fine Wheat Flour, mix with it two Ounces of Anniseeds in Powder, and three quarters of an Ounce of Cummin in Seed, also powdered; Seeds of Carthamus powdered, a Dram and half; Fenugreek Seed an Ounce and half, Flour of Brimstone two Ounces, Powder of Vipers three Ounces, Powder of Saffron one Dram, and Powder of Cochineal a Dram and half.

Mix all these Powders perfectly together, stirring them about; and then put to them a Pint of Sallad Oil, a Pound and half of Honey, and two Quarts of White Wine.

Work all this into a Paste with the Hands, adding a little Flour, if it be too soft, and a little Wine, if it be too hard: when it is well wrought, make it up into Balls of the Bigness of a Man's Fist; and give the Horse one of these every Morning in the Water he is to drink, and the same every Evening.

Let the Water be cold, and if he dislike it, give him no other. When he is thirsty he will take to it; and the getting him once to drink it is all the Difficulty, for he will afterwards like it better than any other. In this Manner he will be perfectly cured in three Weeks, and will recover his best Looks, Flesh and Spirit. Care is to be taken that he be kept during the Time, upon good Food, and have gentle Exercise, but never to fatigue him; and that he lie clean and dry.

BOOK VI. SECT. II.

Of COWS and OXEN.

The INTRODUCTION.

TH ESE Creatures are not liable to so many Disorders as the Horse; but there is nothing of greater Importance to the Farmer than a right Knowledge of those to which they are subject, and the best Methods of curing them. A distempered Cow or Ox are worth very little. Most of their Diseases, as they are of a more simple Nature than those of the Horse, are easier of Cure: but there are some which we see mock all the Art of Physic, and all the Rewards a Government can propose for devising a Remedy. The fatal Disorder that has now raged so many Years is a terrible Instance. No Medicines, yet discovered, are able to cure, nor any Regulations to put a Stop to it.

We have examined this Matter with all the Attention the Nature of so weighty an Affair demands; and hope we shall be able to propose something on that Head worthy the Attention of the Farmer and of the Public. We shall begin with Diseases of a less terrible kind, that the Husbandman may be led, by Degrees, to the most important and difficult.

CHAP. I. *For the Fever.*

TH E Farmers find their Cows and Oxen subject, like themselves, to Fevers; and these, though they generally will go off kindly by Assistance, often are of very bad Consequence when neglected. The most common Occasion of them is a Surfeit, and sometimes they will seize them, as ourselves are seized by Sickness, without any visible Cause.

The Signs are these: The Creature foams at the Mouth and hangs down the Head; the Eyes look heavy, and the whole Body trembles; and it frequently groans very mournfully and heavily. It is hot and restless, and does not care for Food, but is continually desiring to drink. These are the genuine Signs of Fevers in Cattle.

The Farmer must take Care that he confound them not with the Symptoms of other Diseases, for this is the general Mistake. Let him remember, that as these are the proper
Signs

Signs of a Fever, so there are no other but these that are to be considered plainly as such.

Many other Disorders will have the Symptoms of a Fever joined with those that are peculiar to themselves; and, in that Case, the Farmer is to be upon his Guard accordingly: he must first distinguish the Disease truly, or all Advice and all Knowledge of Remedies will be fruitless.

In Cattle, as in ourselves, many, nay, most other Disorders, are attended with a Fever; therefore it is natural that feverish Symptoms appear with them: hence let the Farmer, when he sees these Signs here described, in a Creature of this Kind, first examine whether there be not, together with them, some belonging to those Disorders, we shall describe in the succeeding Pages: if there be, then he is to level his Remedies at the Disease they indicate; those Signs of a Fever being symptomatic: and as the other Disorder is the real Cause of them, when that is removed they will go off.

This is the Conduct he is to observe when there are the Signs of a Fever, and those of some other Disease together; but when there are those of a Fever only, that is, those we have here described, and no other, he will find the following Method of Cure generally successful.

First bleed the Creature: and as to the Quantity, that is to be guided not only by the Nature of the Disorder, but by the Condition of the Body: if it be a very violent Fever, more Blood is to be taken away; if less violent less: and if it be an Ox, he may be blooded much more freely than a Milch Cow. A Quart of Blood may be very properly drawn from the former; but it is a general and very wise Rule, that there never should be more than a Pint taken from the latter. Though, if the Symptoms encrease, the Bleeding may be repeated after four and twenty Hours.

When the Creature has been blooded, set it up warm, and give it no Victuals.

Boil, in six or eight Gallons of Water, a Basket-full of Plaintain-Leaves and Roots, and half a Dozen Handfuls of Agrimony, strain them off, and let the Creature drink of this, warm, as often as can be.

The next Day give a Quart of Ale, with half an Ounce of Venice Treacle in it; and repeat this once in eight Hours.

Give some very fresh Hay, sprinkled with cold Water, after all this; and, by Degrees, the Beast will grow well.

During all the Time of the Illness, the Lips must be frequently rubbed and cleaned, for they furr up and grow foul with

with the Heat of the Disorder; and unless this Care be taken, it will not eat or drink.

Let the Creature be kept up till perfectly recovered, and after that let it be taken some Care of several Days.

C H A P. II. *For binding of the Body.*

THIS is a Distemper to which these Cattle are very little liable, for their natural Constitution is to be loose; but, for that Reason, when it does happen, it is to no Creature so dangerous, nor is there any Disorder in Cattle that requires so critical a Method of Cure.

If any of the common Purges that are used for Horses, be given to Cows and Oxen in this Case, they seldom fail to bring on a Disorder in the other Extreme, that is much worse than the first; and the Remedy grows worse than the Disease.

I have found from Experience that the following is a safe and excellent Medicine.

Take a Quarter of a Pound of coarse ordinary Manna, this Sort is to be bought for a fourth Part of the Price of the fine Kind, and yet for any Use it is better. Melt this in a Pint and a half of Ale, put it into a Bottle, and add to it half a Pint of Sweet Oil, and six Ounces of Lenitive Electary. Shake all very well together, then pour out a Gill and half of it: warm this, and give it every Morning and Night till half the Quantity be taken; and then every Morning only till the Remainder is all taken. This never works as a Purge, but it gently produces the Effect, bringing the Creature's Body to a due State and Condition; and as this is brought on gradually, it is sure to continue. I never once knew a Relapse after this Cure.

C H A P. III. *Of Loosenesses in general.*

THIS is a Disorder to which Cows and Oxen are much more liable than the former, the Condition of their Discharges naturally tending to it; and it is for that Reason difficult of Cure, if not taken in Time. When it first comes on, it affects them no other Way than by making the Discharge thinner, while it retains its natural Colour: after this it becomes paler and sharper, giving the Creature great Pain; and after that the Stools grow bloody.

These are the true Stages of the Distemper. The Farmer is to regard them carefully, for there is to be a different Course

Course of Medicines for each. We shall therefore, after this general Account of the Disorder, consider it under these three particular Heads, delivering the proper Remedies.

C H A P. IV. *For a common Looseness.*

BOIL half a Pound of fresh Roots of Bistort in two Quarts of Water. Strain off the Liquor, and add to it four Ounces of Whiting, and an Ounce of Diascordium, made without Honey: give the Creature half a Pint of this, warm'd and well shook up, three Times in the four and twenty Hours, till the Complaint ceases. Sometimes a single Dose performs a Cure; but in that Case it will be proper to give another Dose, Morning and Night, for two Days, to prevent a Return.

C H A P. V. *For a Looseness with sharp Stools.*

IF the former Medicine have not stopped the Disorder; or if the Farmer have not observed it till it comes to the second Stage, that is, till the Creature's Stools are sharp and discoloured, then the following Remedy is to be used.

Bruise to a gross Powder half a Pound of the dry Root of Tormentill, and boil it in two Quarts of Water to a Quart.

Squeeze this off, add to it a Quart of rough Red Wine: add also a Quarter of a Pound of Whiting, two Ounces of Diascordium without Honey, and one Ounce of Japan Earth. Shake this very well together. Warm it every Time it is given, and let the Cow have half a Pint of it for a Dose, three Times a Day, till perfectly recovered.

C H A P. VI. *For a Looseness with bloody Stools.*

THIS Disorder sometimes comes on at once; but more frequently it is the Consequence of Neglect, or wrong Medicines given for the others; or of the Violence of the Disorder, which sometimes will not be conquered by the very best.

The natural Course of the Disorder is this: a sharp Humour falls upon the Bowels, and the Stools are thin and cutting.

After a Time they wear off the slimy Coat of the Bowels, and then what comes away is discoloured; and after this they wear the very Insides of the Guts themselves, and then
come

come bloody Stools. This is the last and worst Stage of the Distemper, and it is very dangerous.

When it has arrived at this Degree, the following Method is to be taken :

First let the Creature be blooded, but not largely ; then prepare this Medicine.

Bruise to Pieces half a Pound of dry Roots of Tormentill, six Ounces of dry Pomegranate-Bark, and two Pounds of the Leaves and Roots of Plantain.

Boil these in three Quarts of Water to two. Then put in two Ounces of Cinnamon pounded : let it boil a few Minutes longer, and then take it off.

Set it by to be cold, and then strain it off : add to this three Ounces of Dragon's-Blood, in Powder, and a quarter of an Ounce of Roch-Allum.

Shake all thoroughly together ; and when it is to be given, warm the proper Quantity : this is to be about a Gill and half, and it should be given three Times a Day.

C H A P. VII. *For Loosenesses with great Heat of Body.*

WE have told the Farmer what are the Symptoms of a Fever in these Creatures ; and he is aware that they may happen with other Disorders. A Purging is one of those with which they may happen, and in that Case it is not to be treated as a Fever alone, neither is the Disorder to be considered only as a Purging : a due Regard is to be had to both ; and the following Medicine being founded on Reason, and supported by repeated Experience, I shall earnestly recommend for this Purpose to the Farmer.

Cut into Slices six Ounces of the Root of the Herb called Avens, or Herb Bennet. It is not sold at the Druggists nor at the Market, but it is common on Ditch-Banks. The Flower is little and yellow ; the Head is a small Burr ; and the Root smells like Cloves. Let this be boiled in three Quarts of Water to two Quarts, adding, toward the End of the Boiling, an Ounce of fine Cinnamon, and two Ounces of Chips of Logwood, such as is used by the Dyers.

Strain off this Liquor, and add to it an Ounce of Powder of Virginian Snake Root, and a Pint of Red Port Wine.

Give the Creature half a Pint, warm, twice in twenty-four Hours.

C H A P. VIII. *For the Obstruction of the Liver.*

THIS is a Disorder to which Cows and Oxen are very liable; the Farmers are acquainted very well with the Symptoms of it, though not with the Cause; it is what they call by the general Name of an inward Sicknefs.

The Signs by which it is known are these; an Uneasiness sensible in all their Actions, and a Laziness or Unwillingness to move. To this is to be added a Scurfyness, and harsh Dryness of their Lips, and a Dryness of their Noses in a Morning.

This last is a very singular but very certain Symptom.

When these Cattle are well, if they be observed in a Morning, there is always a Drop of Dew, like a Pearl, hangs upon the Nose, but when they are sick it is commonly wanting. No Disease sooner takes the Effect of getting off this Mark of Health, but it is not peculiar to this. If the other Symptoms shew that the Disorder is of that Kind, this joins with them to confirm it; but if not, the Cause is to be sought farther. In Case of an Obstruction of the Liver, the Remedy is this:

Take a Pound of great Celandine, dug up with the Roots, cut it all to Pieces, Leaves, Stalks, and Roots together, and put it into a Pot, with two Gallons of Water, let it boil up a few Minutes; then add half a Pound of Madder Root, ten Ounces of Turmeric, and four Ounces of fresh Roots of Fennel. Boil these very well, and then strain off the Liquor.

Get a Hat-Crown full of Wood-lice, they are common enough about decay'd Timber, and under Stones. Pound these with a Pint of White Wine, and squeeze out the Juice, then add this to the strained Liquor.

Shake this up every Time it is to be used, and warm half a Pint of it for a Dose. It should be given every Night and Morning for ten Days. This is the usual Time required to perform a perfect Cure: it may be sooner, or it may require a few Days longer; but the Medicine will hardly fail.

C H A P. IX. *Of bloody Urine.*

THIS is a Disorder to which Cows are very liable, and, if not taken Care of in Time, it is a very fatal one. The Method of Cure is this:

Take the Cow into a warm House, where she is to be kept till cured.

Bleed her about three Quarters of a Pint, and then give the following Medicine :

Gather a Basket-full of that Sort of Cranebill, call'd Herb Robert. Stamp it in a Marble Mortar, and press out the Juice ; give the Cow a Quarter of a Pint of this every Morning and Night, and it generally will perform a Cure in about three Days.

It is a kind of Specific for the Disorder, and cures with surprising Quickness : but there are some Cases in which other Disorders bring on this bloody Urine, and then this Medicine does not answer.

Let it be try'd only six or seven Doses, and if that do not succeed, have Recourse to the following.

Boil in a Gallon of Water a great Quantity of the same Herb Robert, and as much Shepherd's Purse. When they have boil'd well half an Hour, put in a good Stick of Cinnamon ; and after boiling a few Minutes longer, set it off the Fire. Then strain it and set it by to cool.

Dissolve in this two Drams of Sugar of Lead, and add one hundred Drops of Spirit of Vitriol.

Shake all well together, and give the Creature a Gill of it cold every four Hours, till the Cure is perfected.

C H A P. X. *For Running of the Nose.*

THIS Disease which grows to such a terrible Height in Horses, under the Name of the Glanders, is very slight in Comparison of that, in these Cattle. It proceeds from Cold, and the Running is like that from our own Noses in a like Case ; only as they hold their Heads down it is not so easily cur'd, and it will encrease upon them to a mischievous Disorder in Time, if not stopp'd.

Take the Creature up, and let it be kept warm.

Bleed it about a Pint, and then give the following :

Boil a Pint of Ale, and dissolve in it half an Ounce of Venice Treacle.

Give it warm, and let it be repeated every Night and Morning.

Give the Creature good Provender while under this Method of Cure ; and during the taking of the Medicine use the following Application to the Part. Melt some fresh Butter ; and stir in as much Flower of Brimstone as will make it a thick Ointment. Rub some of this all over a Couple of Goose Feathers, and warm them a little before the Fire ; anoint the Inside

side of the Nostrils carefully, but thoroughly, every Morning and Evening with this, till the Disorder ceases entirely.

C H A P. XI. *For Worms.*

COWS and Oxen are subject to have Worms bred in their Bowels, and they are greatly disordered by them; they will prevent their thriving, and make them restless and untractable. The Remedy is this:

Chop to Pieces some Savin-Tops, and Leaves of Bear's-foot, mix with these a little Salt of Steel, and work up the Whole into a Sort of Paste with Butter. Divide this into small Balls, and give one of them every Morning early for a Week or longer; keep the Creature without Meat three Hours after the Medicine, but let her drink as much as she chuses.

If this Medicine do not succeed alone, it must be assisted in the following Manner:

Diffolve half an Ounce of black Soap in a Quart of Sweet-wort, and give this every Morning after the Ball of Savin. In this Manner the Cure will usually be perfected in a few Days.

C H A P. XII. *Of Worms in the Tail.*

BESIDE the Worms that breed within the Bodies of Cattle, there are a very troublesome and mischievous Kind that breed and live externally in the Tail.

They torment the Creatures out of their Lives, waste their Strength and Spirits, and keep them in continual pining. They usually grow lean; their Backs become weak; when they are lain down they are scarce able to get up again, and they have a Faintness in their Looks and Motions.

When the Farmer sees a Cow or Ox in this Condition, let him examine the under Parts of the Tail. He will first perceive that the Hair is fallen off; then that there are a multitude of little Sores; and, upon further Examination, he will perceive, that the Tail is almost eat asunder in several Places at the Joints.

This might seem to be a natural ulcerated State of the Tail; but it is, in Reality, owing to a Multitude of eating Worms, which will be found easily enough upon looking after them. They are occasioned by Foulness of the Tail, which tempts a particular Kind of Fly to lay its Eggs there; or, according to the common Expression, to blow it.

These Worms are hatched from the Eggs, and they live their Time in the Tail amidst these Sores; after which they drop off, and take their Chance upon the Ground, where, if not trodden to Pieces, they harden outwardly, and after a while, they come out a Fly, like the Parent Animal.

There never want a Succession of these Tormentors; for the Condition of the Tail draws more Flies to blow it, like Meat that begins to putrify, and thus the Disease continually encreases.

The Farmer thus understanding the Nature and Cause of the Disorder, will know how to guard against the Accident to which it is owing. And we shall next inform him of the Remedy.

It is only in Summer the Disorder takes its Rise; though, when once established, it will continue at all Seasons.

Therefore as Precaution is in all these Cases easier and better than a Cure, let him take Care in Time. We have told him that it is Foulness on the under Part of the Tail in Cows, that first brings the Flies to them. Nature has so dispos'd the Tail in this Creature, that it is very liable to be made foul. This is an Inconvenience, but it is attended with many Advantages; it is therefore the Business of the Farmer to remedy the Disadvantage, which is easy, that the Creature, and himself in Consequence, may reap the Benefit.

The Dung of the Cow and her Urine, will be apt to hang upon this under Side of the Tail; and after Calving, there will be also greater Inconveniences of the same Kind: therefore let a Person be employed, once in three or four Days, to clean the Tails of the Milch Cows, in particular in this Part, which will be very easy; and of the Oxen, as there may be Occasion. This will be very agreeable to the Creatures, and were there no other Advantage it would be worth while for this, because the more comfortable they are kept the better they thrive. But if this Care be taken there will be no such Thing as the Tail Worm known. Cleanliness will not only prevent the Disorder, but in the first Stages will cure it. The best Washing is performed by Means of a Brush and Soap Suds, and if a few of the Worms should be bred, this will perfectly destroy them. We shall hope the Farmer will take this Care, and he will need no farther Information; but as a Neglect of this may have happened, or the Disorder may have some Way got footing where he little expects, we shall here deliver also the Remedy.

Chuse out a Pound and half of fine fresh and new made Stone

Stone Lime; boil a Gallon of Water, and pour it all at once upon the Lime in a very large Earthen Pan.

It will bubble up in a surprising Manner. Stir it well together, cover it up when cold, and let it stand all Night to settle; there will be a very strong Lime Water, though but a small Quantity of it. In the Morning let it be poured clear off, and kept for Use.

Take up the Cows that have the Disorder, and keep them dry and carefully while they are under Cure.

Make a very strong Lather of Soap Suds in soft Water; and first of all with Flannels, and afterwards with a Brush wetted in these Suds, wash the Tails in every Part perfectly clean; and the more to promote the perfect cleaning of them, cut off the Hair that remains as short as can be.

After the Tails have been thus cleaned and are dry, wash them in the same Manner with this strong Lime Water. Observe after four or five Days, whether the Disorder be cured; if not, farther Methods must be taken. Once a Day will be enough to dress the Tails by these two Washings, but it must be every Time done in this careful Manner, first by the Soap Suds, and afterwards by the Lime Water. If these fail the following Method is to be used.

Stamp a good Quantity of the fresh Tops of Rue and Savin; when they are reduced to a Paste, add a little white Hellebore and Stone Ocre, both in Powder, and some Wood Soot and a little Salt. Beat all this up again, and then mix in some Butter. When this is ready, and the Tail perfectly cleaned, let it be slit along all the Way down the Inside, nearly to the Bone, and very thoroughly anointed with this.

If this does not cure in three or four Times, let the Tail be rub'd with a small Quantity of the common blue Ointment, made of Quicksilver, Venice Turpentine, and Hog's Lard.

These several Methods are to be tried one after another; usually the first succeeds, if not, the second rarely fails; but if none will do, the last Resource is to cut off the Tail. But it is best to fatten up the Beast after this for Sale directly.

C H A P. XIII. *For Boils on the Flesh.*

COWS are subject sometimes naturally to large and painful Boils; and sometimes they fall into the same Misfortune in a surprising Manner, by Means of a Fly, as in the former Instance.

We shall consider these Cases separately.

When a Boil comes naturally on a Cow or Ox, the Thickness of the Skin, and the cold Constitution of the Animal make them ripen slowly, and they also heal slowly and difficultly afterwards. Nature is, in these Cases, to be assisted in the following Manner. For the ripening of a Boil, take up some white Lilly Roots, and boil them in Milk and Water till they are perfectly soft. Then lay them hot upon the Boil. Bind them on if that can be done conveniently, if not, let a Person hold them on till they are cold.

This is to be repeated as Occasion requires; the oftener the better; and the Boil will ripen and come to a Head.

The opening of a Boil when it is in this proper Condition, may be done either by a Knife, or a red hot Iron, and the general Practice is by the latter Method.

When the Matter is discharged, which should be promoted by a Person's pressing it gently, let it be dressed with the following Ointment. Put into an Earthen Pipkin half a Pound of Tar, and three quarters of a Pound of Horse Turpentine; set it on a gentle Fire, and as it melts throw in a little Hog's Lard, about two Ounces will be sufficient. Stir all well together, and dress the Part every Day with some of this warm, till it is healed.

The other Accident of Boils occasioned by Flies, is much more wonderful than any thing relating to this Creature, and the Discovery of it was made by Mr. DE REAUMUR, of the Royal Academy of Sciences at PARIS, and is delivered in the fourth Volume of his Memoirs, very much at large. The very same Thing happens in ENGLAND, and what we see verifies his Accounts.

There is a large Fly, that in Autumn teazes the Cattle prodigiously. It settles upon them, and lays its Eggs in a small Wound, that it makes for that Purpose in the Skin. These Eggs hatch in Time, and the Part swells with the Hurt. A Cow shall thus be covered with filthy Boils, while her Blood is in a perfect good State, and this Accident the only Cause of it. There is a Maggot in every one of these Boils, which feeds upon the Matter bred there till it is of full Growth, and then crawls out and takes its Chance for appearing in the Fly State, as we have shewn of the other.

There is no Need to suffer the Creature to be tormented in that Manner till the Maggot goes out of itself; but the Assistance of a careful Hand should be given to clear her of them at once.

Every one of these Boils or Lumps should be opened with a sharp Knife; and the Maggot taken out and destroyed.

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The Wound is then to be dressed once or twice with the Ointment before directed, and the Creature will be perfectly freed from the Torment.

C H A P. XIV. *For Disorders of the Lungs.*

TH E S E are of various Kinds in the Cow and Ox Kinds, as in ourselves, but Experience shews that one Remedy will serve for them all. Sometimes the Creature breathes with Difficulty, sometimes coughs and wheezes; and in either Case, or any other, proceeding from the Lungs, give the following Medicine. Bruise four Heads of Garlick, and press out the Juice, mix this with a Quart of new Milk, and add a quarter of a Pint of Tar. This will serve for four Doses. One is to be given every Morning till the Cure is compleated. About four Doses usually answer the Purpose, but if more is required, the same Quantity is to be mixed up over again. The Tar does not mingle well with the rest, but these are not very nice Creatures, so it goes down.

If the Disorder be obstinate, and do not readily give Way to the Remedies, the Creature should be blooded, and they will then take Effect.

C H A P. XV. *For Foulnesses of the Skin.*

CA T T L E of this Species are cleaner in their Hides than most others, but they are not altogether free from Blotches, Scurf, and Scales.

When these appear they must instantly be taken Care of, for the Beast can never thrive that has them.

First of all let the Cause be considered, which is often only want of Cleanliness, sometimes a Disorder in the Blood; and in some Cases it is owing to both together.

Foulness of Diet is the common Cause of this Disorder in the Blood; and this is usually occasioned by that Sort of rank Grass which grows in wet Places, and the Weeds among it.

Therefore to undertake the Cure rationally let the first Thing be a Change of Pasture. From a low Ground full of rank Weeds, and abounding with Mud, remove the Cattle to a high dry Piece of Pasture, where the Grass is very sweet, and the Soil gravelly or otherwise dry, so that there can be no Dirt for them.

If the Disorder be only owing to Uncleanliness, this Change alone will cure the Cattle.

If the Blood be concerned, this is also a very proper Method of assisting the Effect of Medicines.

Let the Creatures be blooded : about a Pint and half from the Ox, and half that Quantity from the Cow.

Then let them be taken in and perfectly cleaned. Warm Soap Suds, a soft Brush and Flannels are the proper Remedies for this Foulness, or they are the needful Preparations for others.

When the Cattle have been perfectly cleaned, if any Scales remain let them be picked off; and the next Day let the Washing be repeated. This, and the Cleanness of the Pasture, will fully answer this first Purpose.

The next Day let the Creature be washed well over with the Lime Water, directed to be made in a former Chapter; and if any of the Scabs have grown to a Bigness since they were pick'd off, they must be rub'd again, that the Lime Water may get to the Root of the Disorder.

Let this be repeated three Times, at two Days Distance; and all the while let there be some Flower of Brimstone sprinkled among the Hay that is given them in a Morning. In this Manner their Blood will be sweetened at the same Time that the outward Remedies perfectly cure the Disorder.

C H A P. XVI. *Of falling of the Palate.*

THIS is a Disorder that frequently seizes upon Cattle after hard Labour and Colds, and is of a very troublesome Nature, if not provided against in Time.

When the Palate is first fallen it is not difficult to replace, and keep it up; but when it has been any Time down the Difficulty of putting it up, and the Readiness to fall again, are very great. I have known an Ox obliged to be killed when it was not intended, nor was he fit, because he would otherwise have been starved by the unconquerable Continuance and Relapses into this Disorder.

The Farmer will perceive that the Creature has this Disorder by his great Uneasiness, and a particular Kind of hollow Groaning: he will be continually striving to eat, but not able to swallow, and thus without Care he would go on till entirely starved.

The Remedy is this; cast the Creature, and getting the Hand into his Mouth replace the Palate as it should be: then rub over it some Honey and Pepper mixed together, and let him rise again: half an Hour afterwards bleed him a Pint and half

half or more; and thus the Complaint is commonly to be cured without any Danger of a Relapse.

He must not be fed with Hay, but for some Days only with fresh sweet Grass.

C H A P. XVII. *Of Hurts in the Feet.*

WHEN a Cow or Ox is observed to limp, and keep one or more of his Feet from the Ground as much as he can, the Occasion usually is some Complaint about the Hoof, and nothing so common as a Soreness between the Cloves.

For this the Remedy is easy:

Cast him, and clean the Space between the Cloves perfectly well, rubbing it till it bleeds. In the same Manner clean all about the Foot.

Then chop a Quantity of the Leaves and Tops of Mugwort, boil them soft in Milk and Water, and put some in between the Cloves, and some about the whole Hoof, tie it on and let the Creature be kept quiet: the Cure is generally compleated at one Dressing.

Some accidental Foulness is oftener the Cause of this Complaint than any thing else; so that cleaning it, and laying on a soft healing Cataplasm in this Manner, is a very natural Remedy.

When the Case is worse, and there are actual Sores between the Hoofs, the best Method is to clean them as already directed, and then to dress them with a Quantity of Black Basilicon spread all over some Tow, and drawn in between the Cloves. This should be repeated every Day till the Cure is perfected.

C H A P. XVIII. *Of the panting Evil.*

THIS is a Disorder that shews itself in the Creature's Faintness and Unwillingness to stir, in his frequent panting, and as it were sighing. It renders the Creature weak, and he generally wastes in Flesh.

The Remedy is this:

Boil a Quart of Ale and dissolve in it half an Ounce of Mithridate, and a Scruple of Powder of Saffron.

Give this warm every Morning for four Times; it very rarely fails to make a Cure. The Creature must be fed upon dry sweet Hay, and have his Drink warm during the Cure.

C H A P.

C H A P. XIX. *Of the Yellows.*

THIS Disorder in Cattle is of the same Nature with the Jaundice in ourselves. It is perceived first by a Yellowness in the Eyes, and in the Lips; and the Creature is always lazy and weak. The Cure is this:

Bruise in a Marble Mortar a Basketful of great Celandine Roots, Leaves and Stalks together: add to this a good Handful of Rue, and then squeeze out the Juice.

Mix with this an equal Quantity of Juice of Wood Lice, and give the Beast a Gill and half of it every Morning, for about a Week; and afterwards every other Morning for a Week longer. In this Time the Cure is generally compleated, and there is no Danger of a Return of the Complaint.

C H A P. XX. *Of the Gargil.*

THIS is a very terrible Disease, and more difficult of Cure than most others.

It is an external Swelling and Inflammation, but the Blood is always concerned; and the Disorder for that Reason spreads and defies all outward Remedies.

It appears at first in the lower Part of the Dewlap, in Form of a hard inflamed Lump, which spreads till it occupies the whole Dewlap, and reaches to the Throat, in which Case it is very often fatal.

This is the Disorder called the Gargil distinctly and properly considered. It affects the Dewlap and Throat only; and it is the first Step toward the most dangerous Disorders; but it is of a distinct Nature in itself, too often destroying the Cattle without encreasing to any greater Degree of Malignancy than this.

Farmers confound the Terms of Diseases, and Farriers more.

Authors who should write for their Information copy their Mistakes, and consequently tell them only what they knew before, confirming them in Error, not leading to Truth.

We are entering now upon a Point of vast Importance; and unless the first Steps be cleared of Perplexity and Confusion, the rest will never be understood.

The Gargil and Garget are treated by these Writers, as well as spoken of by Farmers and others, as the same Disorder, but this is the Distinction.

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The Gargil is a swelling in the Dewlap and Throat, extending no farther; the Garget is a Swelling of the Head and Eyes, with other external Parts, with Inflammation; and the Murrain is the same Swelling and Inflammation, extending itself also to the Inside of the Throat, the Stomach, and the Bowels.

This last is the Distemper now, and of many late Years so fatal among the horned Cattle, it becomes the Farmer to understand it in all its Progress; and if the Physicians who have written so much about it had descended from the Closet to the Cow-house, they would have found the same Facts; and knowing something of the Cause, they would have been more likely to have made a proper Judgment as to the Method of Cure.

The State of the three Distempers is this: The Gargil can never change to the Garget; and if ever it seems to do so, it is that the Farmer has observed the Throat more than the Head and Eyes, when they have been also affected, and the Disorder has been the Garget all the Time, while he took it for the Gargil.

The Gargil may very naturally, and very frequently does change into the Murrain; but the Murrain may begin of itself without it.

That is, a Swelling of the outer Parts of the Head and Neck, which is the Garget may spread inwards, and so be converted into a Murrain; or the Inflammation and Swelling may begin in the inner Parts, and then it is most dangerous, because least seen; and is most infectious because the Breath conveys it to all those which have their Heads near: this is the Murrain appearing in its proper Form; and this is of all the most fatal.

The Reader will thus understand the several Stages of the Disorder among the horned Cattle, and thus perceive what is best to be done for preventing the Infection.

Having thus, from the first Origin, traced its several Degrees and Appearances, we shall now deliver the Method of Cure for this, which is but a Resemblance, not an absolute Degree of it.

As soon as the Gargil is perceived let the following Ointment be prepared. Melt together equal Parts of Pitch and Turpentine, and add a small Quantity of Bees Wax. Let this be in Readness.

Slit open the Dewlap for three Inches in Length where the Swelling is, and let it bleed freely.

Bruise in a Marble Mortar a Handful of the Leaves of the
great

great black Hellebore, and add to them some Hog's Lard; beat the whole up, and thrust in a good Quantity into the Slit. Sow up the Wound to keep in the Ointment, and keep the Creature clean, warm and quiet for two Days.

Then open the Stitches, take out the Remains of the Hellebore, and melt some of the Ointment just directed to be made: dip a large Pledget of Tow in this, and put it into the Wound hot. Repeat this Dressing every Day till the Wound heals.

This generally proves a Remedy for the Gargil, when it is not of a very violent Kind; and when it is, scarce any Thing will be found effectual. The Addition of equal Parts of Gum Elemi and a few Grains of Euphorbium to the Ointment, is the best that can be done.

Let the Farmer first take Care that he distinguishes that it is really the Gargil, and nothing more that ails the Beast, and then he will need to do more than this.

C H A P. XXI. *Of the Garget.*

THE Garget commonly confounded with the former in Name, as the Words much resemble one another, is in Effect a quite different Disease. It is, as we have observed, in itself very terrible; and it is the first Stage often of that dreadful Disease, under which our Cattle now suffer.

The Garget is a Disorder of the outward Parts of the Head, which is attended with Swelling and Inflammation; which frequently spreads into the Mouth, and sometimes into the Throat and down to the Intestines. In this last Case it is properly the Murrain, though it begun with the Garget.

It is very essential to treat of these distinctly, for the Remedies are different; and the proper Distinction is this: the Garget is the swelling of the Head, Eyes and Lips, extending itself to the Gums and Tongue, but no farther: when it goes farther it acquires another Name.

The most usual Cause of the Garget is *bad Water*; but the extreme Degree of it and of the Murrain often arise from an infectious State of the Air; and it would be vain to seek their Origin elsewhere.

When the Farmer sees an Ox or Cow affected in this Manner, with a Swelling in the Head discovering itself about the Eyes, the first Thing he is to do is to examine the Lips; and if they are swelled, he must look into the Mouth and examine the Tongue.

He must be careful in his Observations, because upon the Difference in this Respect depends the Method of Cure, which is peculiar in each Degree of this terrible Distemper.

If the Eyes, Lips, and whole Outside of the Head be affected, and nothing more, the Remedy is to be as follows :

First let the Creature be blooded very largely, and immediately after give the following Mixture.

Heat a Quart of Ale, and dissolve in it three quarters of an Ounce of Mithridate ; add ten Grains of Saffron, and a Tea Spoonful of sweet Spirit of Nitre : give this every six Hours, and observe whether the Swelling about the Eyes decrease ; for this is the great Symptom by which to know whether the Medicine takes Effect. Give the Drink warm, and as much as the Creature pleases.

If the Swelling continues, especially if it encreases, bleed again more largely than before ; and instead of the Medicine before directed, give three Ounces of GLAUBER'S Salt dissolved in Water.

This will purge the Creature pretty briskly ; and by this Change of the Remedies there is a fair Chance for a Cure : but we don't pretend to promise that Certainty of Success in these as in many of the preceding Cases.

The Distemper is of a very desperate Kind ; and there is always Danger. If these Methods both fail, the only proper Course is to continue them interchangeably, till there is an Amendment or Death. But we have seen it in many Instances, that the first Doses have been successful.

The next Stage in which we are to consider this Disease, is that in which the Inside of the Lips and the Tongue are affected.

This is still the Disorder distinctively called the Garget, provided that the Outside of the Head be affected also ; but if otherwise it is properly the Murrain, though in a less Degree than is usually understood by that Name.

This we have observed in various Instances : we have seen a Murrain, that at first appeared less terrible than a Garget ; but it does not long continue in that Condition : it grows worse presently. The Appearance of the Murrain in the Mouth alone is only its first Stage, according to the peculiar Manner of taking the Infection.

The Farmer is to consider and examine this Distinction carefully ; for those Medicines will be proper in one Case, that will be trifling in the other.

Thus then, if he first perceive the Outside of the Head swell, let him examine within the Mouth, to know whether it have also spread so far ; and on the other Hand, if he first perceive

perceive the Disorder in the Mouth, let him next examine the Head on the Outside, to distinguish whether it be the Garget, or the first Stage of the Murrain. We are to suppose it the first of these Cases; and that he finds the Eyes starting, enflamed and swelled; the Lips hot and swelled; and perhaps the under Part of the Neck, for sometimes that joins: and he will also perceive the Tongue to be very much disordered. This, in the present Case, is a very essential Point; for the Tongue is usually the principal Seat of the Distemper.

Let the upper and under Side of the Tongue be searched carefully, and probably there will be found one or more Blisters on the Top or Sides, or a Lodgment of Matter under it; sometimes both.

These Blisters must be cut, and the Point of a Lancet or fine Knife must be thrust into the sore or swelled Part underneath.

This done, the whole Tongue is to be washed several Times with sharp Vinegar mixed with Salt, and rubbed with a clean Cloth: by this Means the foul and offensive Matter will be let out. Then the Creature must be kept to the following Course of Medicines:

First let him be largely blooded.

Then mix together a Pint of Ale, three quarters of an Ounce of Venice Treacle, a quarter of an Ounce of Aniseeds in Powder, and two Spoonfuls of the Juice of Rue: this is all to be heated and given at a Dose; and it must be repeated Morning, Noon and Night. Let the Creature be kept warm, and let his Drink be Water, that has been poured hot upon a good Quantity of the Herb Agrimony, and let him have it warm.

I have seen those who were impatient with this Course, give a Purge in a Day or two, but I never knew it succeed. Many have died while it was operating: and on the other Hand, several have recovered by a careful Perseverance in this Course, which have at first seemed to afford very little Prospect of it.

C H A P. XXII. *Of the Murrain.*

THE Murrain is the highest Degree of these Distempers, and the worst that can fall upon the Cattle of this Species. What we call the Distemper among the horned Cattle at this Time, is the Murrain distinctly and properly so named. It is an Inflammation of the whole Passage through
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the Body from the Mouth to the farthest Extremity of the Guts; and it is attended with a very bad State of the Blood. It sometimes arises from very unfavourable Weather; the drinking bad Water, and being reduced to feed upon rank coarse Grass: but the general Origin of it is in the Air, which there is no accounting for. Some Cattle are, by the State of their Blood and Humours at that Time, more exposed to receive the pestilential Vapours than others; but all are exposed to it: and when it has once taken Place, it spreads by absolute and plain Contagion.

This is the Cause of its being terribly destructive in some Counties, and scarce appearing at all in others: and to this it is owing, that wherever it gets Footing it spreads and continues.

There is no Wonder that Creatures standing near one another receive the Contagion with the Breath, which is sent out in the Respiration from the others; especially as the Temperature of the Air favours the spreading.

Upon this Principle we see the Wisdom of the Legislature, in forbidding Cattle from infected Places to be brought into Counties where the Disease is not: and this gives the Farmer the first Hint of his proper Conduct.

As soon as he perceives this terrible Disorder upon any one of his Cattle, let him separate that from the rest, and take Care of all.

The first Step is to bleed largely; and this should be extended to the sick and the well. In Respect to the sick, it is the proper Step to abate the Inflammation; and as to the rest it may be sufficient to prevent the breaking out of the Disease upon such as would otherwise have had it, from some slight Degree of Infection communicated before the Separation of the sick; or if it do break out upon them, they will have it more favourably.

In another Sense also it is very proper: we see that the Air is at these Times full of the pestilential Matter, and that some Cattle do and others do not receive it. Those whose Blood is in the greatest State of Inflammation are naturally most liable to it; and the Bleeding is a Way of taking off that Condition of the Mass.

The Cattle that are separated by Way of Preservation need no farther Care after bleeding; unless the Disease appear upon any of them. In that Case such as are taken with it, must be separated from the Rest; and this is the Manner of treating them:

As soon as they have been blooded, let a Quantity of Vinegar be made hot, and a little Salt dissolved in it; and with that let their Tongues, Mouths, Lips, and Teeth be thoroughly washed.

Beat in a Marble Mortar half a Dozen large Heads of Garlick: press out the Juice, and add to it an equal Quantity of Tincture of Myrrh. Set on Half a Pint of Ale to be hot, and put to it a quarter of a Pint of this Mixture. When it is all hot together pour in two Spoonfuls of Tar, and then immediately give it to the Creature.

The Tar will not mix with the rest, but it will go down with them.

Let this be repeated once in four Hours; and if there be no Amendment the first Day, let the Creature be blooded again, the Day following, and the same Course continued.

I have seen many other Medicines tried, indeed almost innumerable; for of all Herbs and Drugs that the old Woman and the Doctor have ever recommended in pestilential Distempers, not one has been omitted on this Occasion. The Disease is in itself so terrible, that it would be Falshood and Folly to boast of vast Success from any: but this we can assure the Farmer, whose Condition we most sincerely pity when under this Visitation; that of all the Medicines that have come to our Knowledge this has succeeded best. Many have been absolutely recovered by it, when all who saw them shook their Heads, and supposed them lost.

Beside the great Value of this as a Remedy for the Disease when it is come on, there is nothing so good, as a Preservative against it.

For this Reason, when some Cattle of the Farmer's are taken ill, and are separated from the rest; and when, one after another, several of those set apart fall into it, the whole Number of them should be preserved if possible from the same Fate, by taking largely of this Medicine.

The Farmer will not grudge his Trouble when he sees the Benefit that may arise, and when he considers the Danger from which he is defending them.

They should all have a Dose Night and Morning for ten Days, after their Separation from the sick.

BOOK VI. SECT III.

Of the Diseases of SHEEP.

INTRODUCTION.

THESE, tho' not so numerous as the Disorders to which the larger Cattle, before treated of, are liable, yet are such as it imports the Farmer as well to understand; for they are as fatal as those of the other Cattle, and some of them as difficult of Cure, though the greater Part are easy. We shall explain them severally, according to their Nature; and having established their Distinction according to the Cause and Symptoms, shall lay down for the Cure, such Methods as have been found successful, upon repeated Experience, within our own Knowledge.

CHAP. I. *Of the Fever.*

THE Farmers know very well what they mean by the Fever in their Cattle, and the Name is not without just Reason. The Fever in Sheep is an inflamed State of the Blood, disordering the Eyes and Mouth, so that it is easily seen, and affecting the whole Body of the Creature, though not so visibly.

When these Signs of a feverish Disposition appear in Sheep, the Farmer must feel their Feet; if they are hot, he may be sure he has guess'd right as to the Nature of the Distemper; and this is a needful Caution, because there are other Disorders that will give an inflamed Look to the Eyes and Mouth.

The Disease is often destructive in itself; and frequently it brings on other fatal Disorders.

The Cause is generally Cold. When only two or three are affected by it, the Case is less desperate; but when many together, it is always the more fatal.

The first Thing to be done is to remove the Cause; that is, to keep the Sheep in a warmer and more sheltered Place.

In the Heat of Summer the weaker among the Flock will be sometimes rendered feverish, only by being exposed too

much to it ; and in this Case the first Method is just contrary to the former : he must drive them to shelter : in either Condition they must be kept quiet, and must have wholesome sweet Grass and fresh Water. Then the following Remedies will take place :

First bleed the Sheep that are affected with the Disorder, and afterwards give to each the following Medicine with a Horn.

Heat a Quart of Ale, and dissolve in it an Ounce of Mithridate, add half an Ounce of Virginian Snake-Root, and one Dram of Cochineal in Powder. This Quantity serves for four Doses, and one of them is to be given Night and Morning.

If the Sheep be bound in its Body, an Ounce of Lenitive Electary is to be mixed with each Dose ; but if looser than ordinary, that is not to be regarded during the Course of the Remedies, for it will contribute to the Cure. The four Doses usually are sufficient.

C H A P. II. *For a Purging.*

WE have directed the Farmer to leave Nature to her Course when a Purging comes on, with a Fever, in Sheep ; but when the Fever is abated, the Purging must be stopp'd ; and the same Remedy that answers for this Purpose, may be given in the same Manner for such Purgings as come on of themselves.

Boil a quarter of a Pound of Rasps of Logwood in two Quarts of Water, till but a Quart is left ; when it is near done, put in a Stick of Cinnamon. When it is done, strain it off, and give the Sheep a quarter of a Pint of it, with a Horn, four Times a Day, till the Purging ceases.

This seldom fails to take Effect very kindly upon that Kind of Purging which was a Symptom of a Fever, though it remains after it is over ; but if on other Occasions it does not stay the Disorder, the following Addition will render it sure of Success.

To every Dose of this add a quarter of an Ounce of Diascordium without Honey, and ten Grains of Japan Earth powdered ; give the Doses only Morning and Night, when they are thus increas'd in Strength.

C H A P. III. *Of the Tag.*

THIS though an external Disorder, yet naturally comes in here, because owing to the Complaint last named.

It is a Disorder of the Tail, beginning with Filth and Foulness, and ending in Ulceration and very bad Consequences.

The Tag is situated in the inner Part of the Tail: it consists of Scabs and Sores, very painful and wasting to the Creature; and it is owing to the fouling of this Part by a Purging.

That Tag is always worst which follows a Fever, because the inflamed State of the Blood tends to encrease the Disorder; and when it begins, during the Continuance of the Disease, the Matter of the Fever may chance to settle there. In either Case two Things are to be done; the first is, to stop the Purging, that the Stools may fall as usual; and the other, to clean the Tail.

The last mentioned Remedy, either in its weaker or stronger Form, is to be used to stop the Purging; and the Tail being clipp'd, and the sore Part laid bare, first wash it carefully with Milk and Water Blood-warm, and then with Lime-water. After this turn the Sheep loose into a clean dry Pasture.

Two Days after look at it again, and, if not well, repeat the Washing, and anoint it with Grease and Tar mixed together. Twice doing of this is generally sufficient for the completing of a Cure.

C H A P. IV. *Of the Disorders of the Lungs.*

SHEEP are very subject to be disordered in the Lungs, which is easily perceived in their Breathing, or by their Coughing: nothing requires a more speedy Remedy; for they grow incurable when it is neglected but a little Time, and die as Men in a Consumption.

Change of Air and Pasture are essential to the Cure of this Disease; without this Caution no Remedies will take Place: with it the following rarely fails.

The Cause of this Disorder, in whatever Form it appears, whether in coughing, wheezing, or panting, in Difficulty or Shortness of Breath, is the same. It is owing to Cold; and it generally comes upon Sheep that have been kept in low Grounds in wet Weather.

First drive them into an enclosed Pasture, where there is

short Grass and a gravelly Soil; and, if possible, where there is spring or other running Water.

Bruise a Basket-full of the Leaves of Colt's-foot, and press out the Juice.

Bruise in the same Manner an equal Quantity of Plaintain, Leaves and Roots together, and press out its Juice. Mix these, and bruise as much Garlick as will yield about a fourth Part as much Juice as one of the others. Mix all together, and add to them a Pound of Honey, an Ounce of powdered Anniseeds, and an Ounce and half of powdered Elecampane; give a quarter of a Pint of this, warm, to every Sheep that is affected, once in a Day, and it will by Degrees make a perfect Cure.

Out of a whole Flock thus affected, when the Farmer has taken thorough Care in this Respect, I have known when not one Sheep has been lost. I write this from Experience.

C H A P. V. *Of the Jaundice.*

SHEEP are more subject than any Animal whatsoever to Obstructions of the Liver; and this is generally seen in a Yellowness of the Eyes, and a Tincture of the same Kind in the Skin, when carefully examined. Our Farmers, in some Places, call this the Cholera; or, as they speak it, the Colour: it is properly a Jaundice.

Drive the Sheep that are affected with this Disorder into an open Pasture; and let the Shepherd, or Person who has the Care of them, have Orders to keep them often in Motion, but not to fatigue them; then prepare the following Remedy.

Boil in four Gallons of Water two Pound of Fennel Roots, the same Quantity of Parsley Roots, and twice that Quantity of Roots of Dog-Grass, or Couch-Grass, all cut small; when the Water is very strong of them, and there is about half the Quantity left, strain it off, pressing it hard.

Bruise in a Mortar as much Great Celandine as will yield three Pints of Juice, add this to the Liquor, and lastly put in three Drams of Salt of Steel.

Mix all well together, and every Day heat so much of it as will serve to give every one of the Sheep that is ill a Gill and half for a Dose. This, with the forementioned Directions of good Pasture and Water, and moderate Exercise, rarely fails of a Cure.

C H A P. VI. *Of Stoppages in the Throat.*

WE have treated of Disorders of the Lungs, and shewn the Remedy; but the Farmer will yet find another Disorder imitating the Appearance and Symptoms of these, which is only in the Throat. The Sheep affected with this, wheeze and breathe with Difficulty. It commonly arises from bad Pasturage and Colds. The Remedy is this: Drive them into a higher Ground and keep them warm; then give the following Medicine.

Bruise a good Quantity of Penny-royal, and squeeze out the Juice. Put to a Quart of this a Pound of Honey, and half a Pint of sharp Vinegar.

Give the Sheep half a Pint of this, Blood-warm, every Night.

Penny-royal is, by some, delivered as a general Remedy for all Disorders of Sheep; but this is very erroneous: nothing has been hitherto so little understood as the Medicines proper for Cattle. What are here delivered, are, in general, supported by Experience; and that Physician who has Judgment to propose more Remedies, and Patience to see them try'd fairly; to approve and establish the best, alter and amend the others, and finally to publish the Result of all, will deserve a Statue, for the Good done to his Country, more than all her Heroes.

C H A P. VII. *Of Sturdyness.*

THE Disorder Farmers call by this Name, is a Kind of Vertigo or Giddiness in the Head in Sheep. It rises principally from very rich Feeding, and is often fatal. The Cure is this.

Bleed the Sheep largely, then give the following Draught. Bruise some Roots of wild Valerian; squeeze out the Juice, heat it, and give a quarter of a Pint. Repeat this once in four Hours.

When the Sheep is recovered, turn it upon the Common, or into some barren hilly Pasture; it will be kept from Relapses by having but little Food, and that perfectly wholesome. When this Disease returns it is commonly fatal.

C H A P. VIII. *Of the Wood Evil.*

THE Disorder Farmers understand by this Name is a kind of Cramp: it seizes the Legs of Sheep, and will often affect a whole Flock at once.

The Cause is cold and wet. The lying under the Drip of Trees in Rainy Seasons has often occasioned it, and thence it got the Name of the Wood Evil.

The first Care is to remove the Sheep into a dry Pasture, and then the Cause being removed, proper Remedies may take Effect upon the Disease, which would otherwise be incurable.

Boil in a large Quantity of Ale as much common Cinquefoil and Hedge Mustard as can well be stir'd into it. When the Liquor is very strong, strain it off, and add a Pint of Juice of Valerian Root to every Gallon of the Decoction.

Give the Sheep that are affected with the Illness half a Pint of this, in a Horn, Morning and Night.

Boil in Vinegar a large Quantity of the Leaves of Hedge-Mustard, and with this Liquor, hot, rub the Legs of the Sheep.

The Trouble of this Method must not dishearten the Farmer from observing it punctually, for the whole Flock may be lost if it be neglected; and when they are once relieved, and in a warmer Pasture, they seldom relapse.

C H A P. IX. *Of the Staggers.*

SHEEP have this Disorder as well as Horses, and it arises from improper Food. They are apt to crop the young Shoots of Trees when in their Reach; and though many of these are wholesome, some are hurtful. It is found by Experience, that the eating the Oak Leaves and Buds is particularly prejudicial; it binds them in the Bowels, and frequently the Staggers follow.

The Symptoms are much like those of the Sturdyness, described before, but more violent; and there is generally a Trembling, at the same Time, of all the Limbs. The Remedy is this.

Dissolve an Ounce of Assafoetida in two Quarts of Water. Give the Sheep a quarter of a Pint of this, warm, every three Hours; it commonly opens their Bowels at the same Time that it takes immediate Effect upon the nervous Disorder, and thus performs a perfect Cure. Some of our Farmers

mers put the *Assafœtida* into the Ears of the Sheep; but that is a very idle Practice. The Medicines are easily given them inwardly with a Horn, and there is no other Way in which any Dependance can be placed upon them.

When the Sheep are thus recovered, let them be kept out of the Way of a Return to the same Food, and they will be in no Danger of a Relapse.

The Farmer will see by the several Accounts of these most ordinary Diseases incident to Sheep, that they are not so subject to them as many other Creatures, from a Variety of unknown Causes, but fall into them principally from a bad Method of keeping. In general, low Grounds are the most unwholesome; for they abound with wet, and they give Birth to many Weeds of a poisonous Nature not found in others. And we see that Woods are disadvantageous on many Accounts: therefore let him be careful of his Feeding, and he will have less to fear on Account of Disorders in this Kind; and when they so happen, they will be lighter and more easily remedy'd.

CHAP. X. *Of the Scab.*

THIS is a filthy Disorder to which Sheep are very liable; but as many of the others, before described, arise oftener from ill Management than any natural Defect, so this more than any.

Sheep kept on Downs, or in dry wholesome Pastures, are very little liable to it; those which lie wet, or get under Droppings of Trees in bad Seasons, are frequently affected by it in the severest Manner.

When the Wet falls upon their Skins, and they are heated afterwards; but especially when they lie under Trees and the Wet falls upon them from the Branches, their Skins soon after grow scurfy, and in a little Time from that there rise Scabs in various Parts of them; upon this the Wool grows loose, and the Sheep pine and become lean.

If it be a Season for Shearing, or that can be done with any Degree of Propriety, nothing is so good a Step to the Cure: if not, the same Remedies must be applied without: Cleanliness is the great Article for keeping them well; and it is vain to begin a Cure without it.

They must be washed every where in the foul Places with Soap-suds, made very strong, and used warm with a Flannel or Brush.

After this they must be turned loose in a clean Pasture, and must be driven up again as soon as well dry'd, and all the sore Parts must be well wetted with Lime-Water.

In both these Applications, the scurfy Parts of the Skin, as well as the scabby Places, must be regarded; and probably the doing this three Times, at two Days distance each, will be a Remedy.

If this fail, the Parts that have been thus washed and cleaned, must be anointed with a Mixture of equal Parts of Tar and Grease, and they will soon be perfectly well. No inward Medicines are required in this Case, for the Complaint is only on the Skin.

C H A P. XI. *Of the Red-Water.*

FARMERS do not seem well to understand themselves in respect of this Disorder; but in some Places call an inward Disease, and in others an outward one, by this Name. The last is the proper Meaning of the Word, and it is a very dangerous Disorder. Though it appears outwardly it is not entirely of the external Kind, as the former; but the Blood is always more or less affected with it, and consequently Care must be taken accordingly, by inward as well as outward Medicines, in the Cure.

The great Mistake has been the attempting it by outward Remedies alone, and this is the Cause why it has been found so difficult of Cure.

The Appearance of the Disorder is about the Breast and Belly principally, but it will spread itself to other Parts. It is an Inflammation of the Skin that often raises it into Blisters, and in those is contained a sharp Humour, thin, watery, and coloured with Blood. This is the Occasion of the Name, and this the Disorder properly called by it.

Nothing must be done to strike it in, but the Cure regularly attempted by amending the bad State of the Blood.

First, the Sheep that are affected with it, must be separated, or otherwise it will be very apt to spread among them; and they must be put where there is sweet Grass and good Water, or the Medicines will take little Effect.

Mix half an Ounce of Flour of Brimstone with an Ounce of Honey; work it well together, and then divide it into two Parts. Dissolve one of these in half a Pint of Juice of Nettles, and give it every Day for a Fortnight. This Method observe with all that are disordered.

Slit

Slit the Blisters when they are full of this watery Humour, and having let the Matter out, wet the Place with Juice of Wormwood.

After four Days of this Course, bleed them pretty plentifully; and then continue the same Method till they are well.

C H A P. XII. *Of the Foot-worm.*

SHEEP are liable to the breeding of Worms between their Feet; but this, like the other Accidents, is principally when they are kept in wet or damp Pastures. It is very painful to them, and will make them pine away.

It is perceived by their frequently holding up one Foot, and by their setting it but tenderly down.

In this Case let the Foot be washed clean, particularly between the Toes, and there will be seen a little Lump like a Tuft of Hair. This is the Head of the Worm. It is to be taken out with Care, for 'tis of a tender Substance, and if it be broke in the Foot it will occasion an Inflammation. The best Method is to open the Flesh on each Side of it, and then, by Means of a Pair of Knippers, to take it very gently out.

Then dress the Wound with Tar and Grease melted together in equal Quantities, and turn the Sheep loose.

It is better to put it into a fresh Pasture; for if the same Disorder returns, it is generally worse.

C H A P. XIII. *Of the Wild-Fire.*

THIS is a very violent Inflammation, which appears in the Manner of a Saint Anthony's Fire, upon the Skin of the Sheep, in different Places; and when it is discovered on one generally infects more; often the whole Flock.

Our Fore-fathers were superstitious on this Occasion, they bury'd the Sheep alive with its Feet upwards at the Door of the Fold; and supposed this acted as a Spell to drive away the Disease. We do not inherit these Errors. The Method to be observed is this:

Such Sheep as are infected with it, are to be separated from the rest: then bleed them, and prepare the following external Remedy. No other is required: and it is singular in this Disorder, that although more violent than the Red-water, it does not at all infect the Blood, so that nothing inward need be given.

Bruise a good Quantity of the Leaves of wild Chervill, and add to them as much Lime-water as will make the Whole
very

very soft. When it is thus beat up together and perfectly mix'd, add as much Powder of Fenugreek-seed as will reduce it to the Consistence of Pap; then put it into a Pan, and set it in a cool Place. Rub the sore or inflamed Part carefully with this every Evening, and make as much lie on as can be kept there; it will take Effect during the Time of Rest, and is to be repated as long as there is Occasion.

C H A P. XIV. *Of Disorders of the Eyes.*

SHEEP are often affected with Colds falling upon their Eyes, and almost blinding them; and, at other Times, the same Accidents arise without any visible Cause. The Remedy in either Case is the same.

Press out the Juice of Great Celandine, and drop a Quantity of it into the Eyes Night and Morning.

C H A P. XV. *Of the Dropsy.*

SHEEP are often swelled with Water in their Bellies; and this, if not regarded in Time, is attended with certain Destruction. There are two Ways in which it is lodged; the one is between the outward Flesh and the Rim; the other is within the Rim. In the first Case, the Cure is easy: in the other, nothing can be done.

The Method, in the first Case, is by a coarse Kind of Tapping.

An Opening is to be made in the Flesh, and a Quill thrust in; this will give the Water a free Passage out, and the Wound heals of itself, if the Sheep be otherwise tolerably healthy: but when the Disease has been of long Continuance, and the Creature is emaciated by it, Nature will not have Strength to heal it; in that Case, the Sheep is to be examined daily, and the Wound dressed with Grease and Tar.

The Creature must be put into a fresh, dry, and wholesome Pasture, and then disposed of as soon as recruited; for this is a Disorder that never fails to return upon any Mismanagement or Neglect in the Keeping.

C H A P. XVI. *Of the Rot.*

THE Rot among Sheep is like the Murrain among larger Cattle, the most destructive of all the Disorders to which they are liable, and the most to be dreaded by the Farmer. We have reserved it for the last Consideration, that what has been

been premised concerning the other Disorders, may have led him so far into the Nature of Animals, as to make him perfectly comprehend all that relates to this.

This Disorder is contagious, like the Murrain. Whenever it appears it usually spreads thro' the whole Flock; and often over the whole neighbouring Country.

Preservation from it is a Point of as much Importance as its Cure; indeed of more, because the Cure is very uncertain.

The Causes of the Rot are various, but the principal is Carelessness in the Owner. Sheep that feed at large upon open Commons, are much more subject to it than such as have Shelter, and are taken due Care of at Nights: those which feed in the dampest Grounds, are most subject to this, as well as to other Diseases; and it frequently arises from a cold Season and dribbling Rains coming on soon after the Shearing. These taint the Skin and bring on the Disorder. Lastly, want of Food will occasion the same Disease; and the eating such Grass as is full of unwholesome Plants. These we shall particularize in a succeeding Chapter.

Such are the Causes of this terrible Disorder in its original Appearance in many Places; but the Farmer, beside these, is to observe that the worst and most common is Infection.

Let him, at all Times, take Care to keep his Sheep out of the Way of these original Causes of the Rot; and he will find the same Care will preserve them from most other Disorders: and, beside this, when the Distemper is any way near him, let him be careful to keep them clear and distant from all others.

Damp Grounds are always dangerous in this Respect, and in wet Seasons especially.

In these wet Times, the best Practice is quickly to remove the Flock to the upland Pastures, and to give them some Hay as a Part of their Food.

The happiest thing that can chance to the Farmer in this Case, is to discover the Disease in Time. The first Notice of it will be perceived in the Eyes; and therefore in a wet Season, and especially at a Time when the Rot is amongst the neighbouring Sheep, let him look into that Part. When a Sheep is infected with this Disorder, the White of the Eyes looks dead and dull, and they have a weak faint Aspect; the Creature is feeble, and his Skin is foul: the Wool is so loose that it comes off in Handfuls with the least Touch; and the Gums will look pale and the Teeth foul. He will be dull and listless in Motion, and heavy, as if his Legs were not able to carry him.

In this Case, the Disease is strong upon the Creature. Many are generally infected at a Time, and the first Care must be to remove them from among the sound ones; the Distinction may be made by the Rules we have just laid down; and the sick must be pent up in a close Fold.

They must be allowed little Water, and their Food must be dry Hay and Oats. The best Way of giving these, is by Means of Troughs placed all round the Fold.

Bleeding, which is beneficial in most other Disorders, is altogether destructive in the Rot. Some have try'd it; and what I write is in Consequence of what I have seen as the Result of their Practice.

It has been observ'd universally, that Sheep fed in Salt Marshes never have the Rot. This put it naturally into People's Thoughts to try Salt as a Cure; and we read Wonders of its Effects.

This also I have seen try'd, and sometimes with good Consequences; but never with the great Success that is boasted by many. Salt is a Preservative against the Rot; and that is all we rationally learn, from the Cattle not being infected with it, that feed in the Salt Marshes; but it is not so certain a Cure.

The best Kind of Salt for this Purpose, is Bay-salt; and the best Way of giving it, is by beating it to Powder, and then sprinkling it among the dry Food. Though we do not advise the Farmer to rely upon it entirely, we shall recommend it, among other Remedies, in this Manner.

Bruise to Powder an Ounce of Grains of Paradise, and four Ounces of Juniper-berries dry'd; add to these two Pounds of Bay-salt and half a Pound of Loaf Sugar, grind them all well together, and sprinkle some of this upon the Hay and the Oats that are given the Sheep.

Let this Course be continued three Days, and look from Time to Time into the Eyes of the Sheep, and examine every other Way, to see whether they mend or grow worse. If there be Signs of Amendment, let the same Course be continued: if not, the following must be used. Steep four Pounds of Antimony in two Gallons of Ale, for a Week; then give the Sheep this every Night and Morning, a Quarter of at a Pint a Time.

Boil a Pound of the Roots of the common Avens, and two Pounds of the Root of Masterwort, in two Gallons of Water, till there is not more than six Quarts remaining: strain this off, and press it hard; then pour a Pint of it into a Pailful of Water that is to be given to the Sheep.

By

By these Means, carefully managed, and under a good Regulation in the Articles of Cleanness, Dryness, and Warmth, the Rot will be often cured: this is all that can be promised upon the most sanguine Expectations; for there are Times when the Disease is so rooted, and when the Temperature of the Air so favours it, that nothing will get the better of its Violence.

In the Course of this Method, if the Sheep have a Distaste to their Food, because of the Salt and other Ingredients mixed among it, they must be omitted for two or three Feedings; and then given in less Quantities: and if this take Effect the other need not be used; if otherwise, it will be best to take the Benefit of both together; the Salt and other Ingredients being sprinkled among the Food, while the Drenches are given at the regular Times.

BOOK VI. SECT. IV.

Of the Disorders of HOGS.

THE INTRODUCTION.

THE Hog is not without its Disorders, tho' they are not so many as those which attend the Sheep. We shall not leave the Farmer uninstructed in any thing that concerns his Interest; wherefore we name them here, and shall deliver the Symptoms by which they are known, and the approved Remedies.

CHAP. I. *Of the Fever.*

WE have shewn how common a Disease a Fever is among Cattle of most Kinds, and the Hog is not exempt from it. The first Symptom of it is his forsaking his Food. The Hog has a ravenous Appetite from Nature, and when the Farmer perceives this he may be sure something is much amiss. He will soon after be perceived to droop and grow faint, and if not taken some Care of will pine in his Flesh, and the Disorder will end in his Destruction.

The

The first Step towards a Cure is bleeding, and the best Place for performing this Operation is behind the Ears. If this Part do not bleed freely, his Tail is next to be cut; and between one and the other there will be got enough. A Pint is a proper Quantity to take away.

After the bleeding put him up warm, and give him a good hot Mefs made of Raspings of Bread, Broth, and some chopped Penny-royal.

This is a Thing he is very fond of: the Bleeding will have given him some Relief, and he will take to it. As soon as he has well tasted it take it away.

This will make him ravenous, and he will swallow it with the Addition of a Medicine, which he would not have done before. This must be *Philonium Romanum*. Half an Ounce of it must be put into a Gallon of the Mefs, and he must eat a little at a Time. If he take above half he will have an over Dose of the Medicine, therefore it must be taken away; and eight Hours he must be kept without any thing else. This will make him ready to take the Remainder, and that probably will make a perfect Cure.

It will be seen when he is well, by his eating freely and heartily: and if he do not appear much recovered the next Day, the Bleeding must be repeated, and the same Medicine given again.

C H A P. II. *Of the Murrain.*

THIS is as fatal to Hogs, as to other Creatures of the Farmer's Stock.

It is owing to eating a vast deal of bad Food; and it discovers itself by the Wateriness of the Eyes, and by the hanging of the Head to one Side: the Creature also is weak, faint, and refuses its Victuals.

The Cure is this. Make a very good warm Mash; and let them be kept all the Afternoon and all the Night fasting before it is set before them. Put into it half a Pound of grey Ground Liver-wort, and the Bigness of an Egg of Red Oaker, with as much Salt-petre as will lie upon a Shilling, powdered.

The Hog will generally be tempted to eat some of this after so much fasting.

When he leaves off, if he have swallowed ever so little, take it away.

Four or five Hours after set it before him again, and he will eat more; and by this Means he will be brought to his Stomach.

Stomach. All his Food must have a little Salt-petre and a good Quantity of Liver-wort in it. This will take Effect, if he be within the Reach of Remedy: but it is a Disease that is very often fatal. Cleanliness and good Management must assist, or no Medicines will do.

C H A P. III. *Of the Jaundice.*

THE Hog is subject to an overflowing of the Gall, which would discolour the Skin if it were less thick and coarse; but it shews itself by a Yellowness of the Eyes and about the Lips, and by a Swelling that rises under the Jaws. The Cure is this. Bruise a good Quantity of great Celandine, and press out the Juice; add to it one fourth Part the Quantity of Vinegar.

Bruise a good Number of Wood-Lice in a Mortar; and when all is ready, make a hot Mash into as much of this as the Hog will eat at a Time; put a Pint of the Juice and Vinegar, and about a Quarter of a Pound of the bruised Wood-lice.

Let him fast three Hours before he has this, and six Hours after it.

He will like the Mash the better for these Ingredients.

If his Stomach be so bad that he will not eat it all at once, it must be taken from him as soon as he shews a Distaste to it, and set before him again in half an Hour after.

A Hog will thus be led to eat almost under any Sickness: and this is the true Method of curing his Disorders of whatever Kind.

C H A P. IV. *For Sickness at the Stomach.*

THE Hog, though his Stomach is naturally very strong, is subject to Sickness, and will cast up his Food. If this be not observed it will encrease upon him, and he will waste away. The Cure is by a Change in his Food; or if it be necessary, the Addition of a Medicine with it: but the first usually answers.

Keep him from all coarse Meats, and give him Beans with a little Water. If this answer alone, it is better than giving Medicines: if it do not, give him every Day among his Food half an Ounce of Mithridate. It will at the same Time warm and strengthen his Stomach; and he must be kept to good Food for Fear of a Relapse.

C H A P.

C H A P. V. *Of the Measles.*

THIS is a common Disorder among Hogs, and shews itself in a Redness of the Eyes, and Foulness of the Skin, and in their neglecting their Food.

The best Remedy is this. Keep the Hog fasting the whole Afternoon and Night. Then set before him a good Mess of Victuals; not large in Quantity, but hot and well prepared, and put into it forty Grains of Salt of Hartshorn, and two Ounces of Bole Armoniac. It will all go down very well after this Fast; and will make a good Beginning of a Cure. The same Method is to be followed every Day till he is perfectly recovered, and for a few Days after, for Fear of Returns.

C H A P. VI. *Of the Lethargy.*

THE Hog will sometimes fall into what is called the Sleeping-Evil or Lethargy. He will doze all Day long, neglect his Food, and pine away.

The Remedy is a Vomit; and the best in the World is this.

Gather a good Quantity of Wall-Pepper, called also Sharp Stone Crop. Bruise this in a Marble Mortar, and press out the Juice.

Keep the Creature fasting all the Afternoon and Night, and in the Morning set before him a warm Mess, into which put a Pint of the Juice of the Stone Crop. He will be tempted to eat by his long Fast; and the Hog is not very curious about Tastes. He will vomit soon after he has swallowed it; and that single Dose will frequently prove a Cure. If this be not sufficient it must be repeated next Day.

C H A P. VII. *Of the swelling of the Milt.*

WHEN a Hog is perceived to be giddy, to reel, and to run principally on one Side, the Farmer is to understand that it is his Milt that is swelled, obstructed, or disordered; and if he be not relieved he will forsake his Food, and pine to Death.

The usual Cause of the Disorder is a Surfeit in feeding upon Mast.

The Cure is this. Bruise a good Quantity of the Leaves and Tops of common Wormwood, and press out the Juice: add to this some Juice of Penny-royal, and give the Hog a
Pint

Pint of it in every Mefs of his Viſuals till he is perfectly recovered; which will be known by the Steadineſs of his Walk and Quietneſs.

C H A P. VIII. *For a Purging.*

HOGS that are taken with a Flux often have it grow to a great Violence upon them, and waſte with it till they are only Skin and Bone. It generally riſes from bad Food. The Cure is this. Make a good Mefs of Food for him, and put into it half a Pound of Acorn Huſks. Obſerve whether he grow better; if he do, repeat the ſame Method till he is perfectly cured.

If this do not ſucceed, give him in every Mefs of his Food a Handful of Tormentill Roots chopped ſmall. This ſcarce ever fails of completing the Cure.

C H A P. IX. *Of Impoſthumes or Boils.*

HOGS are ſubject to Boils and hard Swellings in various Parts; and the beſt Method is to open them, and let out the Matter at a proper Time. A common Knife answers this Purpoſe. The Farmer muſt obſerve to watch for their growing ſoft, that being the Mark that they are in a Condition to be cut. He is then to lay the Boil open the whole Length, and preſs it on the Sides to get out the Matter; and when this is done he muſt anoint the Place with Greaſe and Tar, and it will heal preſently.

C H A P. X. *Of Foulneſs of the Skin.*

THE Hog is naturally an uncleanly Creature, and the Farmer muſt therefore take the more Care to be cleanly in his Management. A wet Styre will ſubject him to Colds; and Fevers will riſe from this: but if it be wet and naſty together, which is too common a Caſe, the firſt Conſequence will be a Foulneſs, Scurf, and Scabbineſs of the Skin. The Hog will pine, and all his Meat will be thrown away upon him, unleſs this be cured.

The Blood is often in Fault in theſe Foulneſſes of the Skin, and then inward Remedies are needful: the others may be tried firſt, and if they do not take Effect, that is a Proof theſe are wanted.

Fiſt bleed the Hog under the Tail, as much as can be well got away: it ought to be a Pint at leaſt. Then prepare ſome

very strong Soap Suds. Rub common soft Soap upon a Scrubbing Brush, dip it in the Suds, and scrub the Hog well all over. This will clean him.

After this wash him well with warm Lime Water, and make the Styer clean; give him dry Litter and wholesome Food, and after two Days clean him again in the same Manner, and again rub him with Lime Water.

If this do not make a Cure his Blood is infected; and Flower of Brimstone must be put into all his Victuals in large Quantities. This with the Repetition of the other will cure. If the Skin be broken in any Place it must be dressed with Tar and Grease mixed together; and when he takes the Brimstone inwardly, some should also be mixed in Ointment.

C H A P. XI. *For sore Ears.*

Sometimes the Hog will have a Soreness about the Ears from Dirt and Filth: more frequently it rises from the Teeth of Dogs; and the worst is when both these Causes come together. The Dogs make the Hurt; and the Dirt occasions it to fester. The best Remedy is this.

Warm some Vinegar, and wash the Ears thoroughly with this till they are clean; then make an Ointment of Tar and Grease in equal Quantities, and add a little common Soap. Rub the fore Parts with this, and repeat it till the Cure is perfected.

C H A P. XII. *Of the Pox.*

THIS is a Name by which the Farmers express a Disorder of their Swine, that shews itself outwardly in a Multitude of Pimples and Blotches; and keeps the Creatures miserable, and makes them pine and waste.

It rises from Wet and Filth in their Styes, and from unwholesome Food.

The Remedy is this. Make a hot Mess for the Creature, and give in it an Ounce of Venice Treacle.

After it has taken this let the whole Skin be well cleaned with Soap Suds, and then wherever the Sores and Pimples are, use the following Ointment. Melt over the Fire two Pounds of Hogs Lard, and stir in half a Pint of Tar. When it is taken off the Fire, put to it as much Flower of Brimstone as will thicken it when cold into a firm Ointment. Rub this upon the Hog every Night for four Times, and keep

keep him dry and clean, and it will commonly make a Cure in that Time.

The Farmer must observe that this Disease is infectious; so that he must separate those Hogs which have it from the rest, and not put them together again till they have been some Time well, and he sees there is no Return of the Disorder.

BOOK VI. SECT. V.

Of the Disorders of POULTRY.

INTRODUCTION.

THESSE Animals have their Disorders like others; and their Remedies are as efficacious and certain. The Farmer will the easier be a Master of this Part of his Care, because there is not the Difference between one Kind of Poultry and another, that there is between one Kind and another of the four-footed Animals. Their Distempers are the same in general of whatever Kind they be, and the same Remedies will make a Cure.

CHAP. I. *Of the Pip.*

THIS is a Disorder peculiar to young Fowls, and it arises from the Want of Water. The natural Moisture of the Mouth in this Case hardens upon the End of the Tongue into a kind of Scale, and this prevents their feeding.

The greatest Care is required to observe in Time which of them have the Disease, for the Remedy is easy.

Let some Bay Salt be melted in a little Vinegar and set ready in a Saucer. Then let the young Creatures be taken up and the Scale loosened, and then pulled off from the Tongue with the Fingers. Then wet the End of the Tongue two or three Times over with the Vinegar and Salt, and turn the Chick loose where he cannot drink for an Hour.

This will prevent a Return.

C H A P. II. *Of the Roup.*

THIS is a Disorder situated in a particular Part, but it will affect the whole Body. It is a small Swelling of an angry inflamed Kind upon the Rump. The Fowls that have it grow sickly, their Feathers stand rough, and they pine.

When they are seen in this Condition, let the Farmer seek for the Swelling and open it with a Knife. Let him squeeze out the Matter, and then wash the Part with hot Vinegar and turn the Fowl loose. This perfectly cures.

C H A P. III. *Of the Flux.*

NO Kind of Poultry can thrive, unless they are properly in Order with Respect to their Excrements; and wrong Food will throw them into Disorders in either Extream. This of the Flux is always occasioned by their eating too great a Quantity of moist Food. The best Remedy is to give them such Food for some Days as tends to the other Extream; and if this fails them, to have Recourse to more powerful Things.

Pease-Bran scalded is a Food they will eat very freely; and it will commonly very well answer the Purpose.

If this does not set them right in two Days, rub to Powder some dry Roots of Tormentil and mix with it: this never fails, and they presently grow well and hearty.

C H A P. IV. *Of Stoppage of the Stools.*

THIS is the contrary Extream, and is owing to a contrary Cause, namely the eating too much dry and binding Meat. It renders their Excrements too dry and hard, and prevents their voiding them so freely as they should.

In this Case, as in the former, the first Attempt to a Remedy should be by the Food; and if that fail these Medicines must be added.

Those Cures performed by a Change of Diet are always more natural and more lasting. For this, give them Bread soaked in Broth; and if that fails, add to the Mels a small Quantity of Manna in this Manner. Skin off the fattest Part of some Liquor in which Meat has been boiled, dissolve in half a Pint of this two Ounces of ordinary Manna, and then put in some Bread to soak.

They

They will eat this very freely, and it will certainly cure them.

C H A P. V. *Of sore Eyes.*

THIS Complaint is very common among Poultry, and it is easily remedied. Their Eyes are often hurt by Accident in their going among Briars, and pecking one another; and they are also subject to swell and inflame with Colds. These several Disorders shew themselves in various Parts of the Eyes and Eye-lids; but one Remedy serves for them all. This I have repeated often with Astonishment at its Success.

Gather equal Quantities of Celandine, Ground Ivy, and Clown's Wound-Wort. Bruise them in a Marble Mortar, and press out the Juice. Add to half a Pint of this four Spoonfuls of White Wine, and dipping a Camel's Hair Pencil in it, rub the Eye-lids and Eyes carefully every Morning and Evening.

C H A P. VI. *Of Vermin upon Poultry.*

NATURE intended great Cleanliness for Birds, and in their wild State they never fail to observe her Dictates. When they are kept in a Yard they have not always Opportunity, and whenever it is omitted they suffer. Their Feathers keep their Skin so warm, that it is a natural Place for the breeding of Vermin of many Kinds: and what is more singular, every Kind of Fowl, as well as every Species of Beast, the Eagle and the Lion not excepted, have their peculiar Kind of Louse, which will be sure to appear when Uncleanliness encourages it.

The Means of Cleanness, according to Nature, are Plenty of good Water and some dry Ground: the Fowls will wash themselves in the one, and rub and dry themselves in the other, whenever they have Opportunity; and thus keeping themselves clean they are free from Vermin: but when they have foul Water it sticks to their Skins, and gives Filth instead of cleaning it away.

Therefore to prevent the Evil, let the Farmer always take Care there be good Water; and a dry Soil in some Part of the Yard.

When it is come on the Remedy is this. Boil a quarter of a Pound of white Hellebore Root sliced in two Quarts of Water to a Pint and a half. Strain this off, put it into a Quart Bottle, and put to it an Ounce of beaten Pepper, and

half an Ounce of Scotch Snuff. Wash the Skin wherever the Vermin are found with this, and it will prove a certain and a speedy Cure. But if they be not thoroughly killed they will soon breed again.

C H A P. VII. *For Sores.*

SORES and Swellings will often appear upon Fowls in different Parts of the Body, and they never fail to make the Creatures pine.

When Poultry droop, and their Feathers hang rough, let the Owner take them up and examine them carefully, he will usually find some such Disorder.

The Cause is usually bad Food, or bad Water, and ill keeping.

The Remedy is this. Melt together in a Pipkin equal Quantities of Refin, Butter and Tar. When the Sore is found bathe it first with warm Milk and Water, and then dress it with this Ointment. Two or three Dressings usually make a Cure; but they must be kept more carefully to prevent a Return.

B O O K VII.

Of the Distemperatures of Trees, Roots, and Herbage, from the Injuries done by Insects, larger Animals, and Weeds.

IN THREE SECTIONS.

SECT. I. *Of INSECTS.*

INTRODUCTION.

WE have laid before the Farmer at large the several Accidents to which his Crops and his Cattle are liable, from the Seasons and other natural Causes; and it remains that we treat of those Distemperatures which may be termed accidental, because they are owing to the Hurts of Insects.

These, though very small Creatures, yet by their Number are able to do great Damage. This will be best guarded against

against by those who most thoroughly understand the Nature of those Creatures. We shall therefore treat of these severally according to their Kinds, and explain to the Farmer their Natures and Qualities; the Accidents, so far as they can be discovered, which cause their abounding at certain Times; and the Methods by which Vegetables of all Kinds under the three distinct Heads of Trees, Roots, and Herbage, may be preserved from them: founding all in this Part, as the preceding, on Experience.

C H A P. I. *Of the Ant.*

THIS little Creature is a very troublesome Enemy to the Farmer in many different Articles, and must be destroyed in some Cases, and guarded against in others with the utmost Caution.

In Pasture Ground it raises Hills, which we have already shewn the Methods of cutting up and destroying: and in plowed Lands it will eat vast Quantities of the Seed before it sprouts. Birds devour much of it, but they wait to see the Shoot; otherwise they know not where to seek for it: but these little Enemies, whose Number enables them to do vast Mischief, partly by what they destroy, and partly by what they carry away, follow it into the Ground, and are themselves unseen, as well as the Havock they make, till the Farmer finds the Misfortune in his poor Shoot. We shall direct him to perceive it sooner, for then it is too late for Remedy.

The Ants are great Breeders, and they are distinguished according to their Sexes: the Males have Wings, the Females none. There are several Kinds of them, the largest living in Woods; but these do little Mischief. The small common Ant is the Kind so hurtful to the Farmer.

Their Eggs are small and round, and they are seldom seen or regarded; what is commonly called the Ant's Egg, is a thin Shell or Case, in which it lies while the Wings are forming. It is strange, People could suppose Ants laid Eggs larger than their whole Body: but this is the Explanation of the Error. All Insects that have Wings lie in a still State some Time; the Silk-Worm, the Caterpillar, the Bee, and all others. This called the Egg is the same State of the Ant; and as they are utterly unable to move, during that Condition, the rest take Care of them, carrying them to Places of Safety.

The Mischief they do to Trees is by eating off the young Buds; but this is only of a few particular Kinds. Some Fruits also they are fond of, as is seen in Gardens. In Grass-Grounds they do no Harm but by those Hills, which are troublesome enough. In new-sown Corn-Fields they are most destructive, creeping in at the Chinks and Crannies of the Ground, and spoiling more than they devour or carry away. They are like the Wolf in the Fold, that will tear twenty Sheep to Pieces when he eats but of one.

Those Kinds of Grain are most subject to this Injury, that have the thinnest Skin and the sweetest Flour. Therefore Wheat is most subject to their Depredations; and the smallest Wheat the most: partly as its Skin is thinnest, and partly as it is easiest of Carriage.

Barley they will attack, especially that which is best, waiting till it is somewhat softened in the Ground.

The other Kinds that suffer most, are Hemp, Flax, and Cole-seed.

Rye they are not very fond of; and all Kinds of Pulse are safe, for they do not like them; the Skins are too thick, and the Meal too bitter.

In Gardens they are mischievous in the same Manner, eating one half of the Seeds that are put into the Ground.

The Remedy is the destroying them; and this is to be done several Ways. First let the Farmer find their Nests, which are under Hedges, about the Stumps of old Trees, and on little Risings of Ground.

Let him carry wet Straw to these Places, cover all the Nests, and fire it. The Smoak will destroy them. And if once going over the Ground do not answer the Purpose, it must be repeated.

The Time for doing this is half an Hour after Sun-set, for they are then all together. In Gardens 'tis a good Method to pour boiling Water upon their Nests, taking the same Time for it.

This is the Way to destroy Ants; but there is also a Method of preventing their Breeding. They hate Lime-Soot and Ashes; these are all good Manures, and should be used where Ants are most likely to come. 'Tis also a good Method to dress the Land with these after they have been choaked with burning the Litter. This perfects the Destruction of them, and they are seldom found to infest such a Piece of Land afterwards.

C H A P. II. *Of Beetles.*

THE several Kinds of Beetles are innumerable; we have them from the Stag-horned Kind, which is nearly as big as a Wren, to the small black Beetle of the Rose-bush, which is scarce big enough to be visible.

They are all bred the same Way, and many of them are great Devourers. The Farmer is aware of them in their winged State; but there is another Condition in which they do him greater Damage.

In the End of Summer they lay their Eggs just under the Surface of the Ground. These hatch into thick white Maggots with six Legs, and after a Time of Rest they come out with Wings, in the proper Form of a Beetle.

In the Maggot or Grub State, they eat the Roots of Grass and Corn; and sometimes they are very terrible in this Destruction. Eight Years since they almost caus'd a Famine in NORFOLK.

In the Beetle State they prey upon Corn in the same Manner as the Ants. They creep into the Cracks of the Ground, and devour the best Grains. The Time of Mischief is when the Grain is swell'd, and before it shoots.

They are more universal Destroyers than the Ants, for they have stronger Jaws, and less Nicety in their Taste. There is no kind of Grain or Pulse secure against them.

The Method of destroying them is this.

Just before the Sowing, carry some wet Litter into the Field; lay it in Heaps, and about Evening set Fire to it. That Fuel is best which makes most and thickest Smoak. They lie concealed in Bushes and Hedges, but they fly at Evening with the Owls: this is therefore the Time to destroy them or drive them away. They are afraid of Smoak as much as the Ants, and they will be choaked in great Numbers by it; and what escape Destruction will get far off.

The same Manures that are useful against the Ant, are in like Manner serviceable against the Beetle: and it is a very good Method, where they are very plentiful, or a Field is particularly in Danger, to scatter Lime over it just after Sowing.

The steeping of Seed-Corn in Brines, and other Liquors, we have treated of in its Place: one great Use of that Practice is defending the Corn from these Devourers; therefore, wherever there is particular Danger either from Ants or Beetles,

Beetles, the Farmer should be sure to put those Ingredients into the Brine which are most disagreeable to them, or most destructive of them. Among all these Ingredients nothing defends Corn so well against the Beetle as Urine.

C H A P. III. *Of Worms.*

THE Gardeners imagine that Worms do them no Harm; but those who have observed the Course of Nature in the Field, can tell them they mistake. There is a particular Time at which they feed upon the Grain; and they are so numerous, that the Destruction is very great.

The Worm is produced in the common Way of other Animals; but it is particular, that each Creature of this Species has both the Sexes. This promotes their large Increase: and as they have nothing of that Change to undergo, which we have shewn must happen to all Winged Insects, there is no Stop in their Growth, and they arrive soon at Perfection.

There are three principal Kinds of Worms, the great and small red Worms, and the Olive-colour'd.

Of these the small red Worms are the most destructive. They are too common in good Lands naturally; and Multitudes are also brought on with the Dung.

The Time when they destroy the Corn is just when it has swell'd, and is beginning to shoot for the Blade and the Root. They at this Time prey upon its tender Substance, and are the Occasion of sometimes Two-thirds of a Crop missing.

A good Method of destroying them, is to drive a Number of Nails half way in upon the lower Part of the Plough which goes into the Ground. These tear the Worms to Pieces in great Numbers; and they are also very useful in the breaking the Ground more fine.

This is therefore, on all Accounts, a very good Method.

Another Way is, to make Fires of wet Litter on different Parts of the Land. This destroys many of the small Worms that are nearest the Surface, and they are what do the Mischief.

But the greatest Remedy of all is to steep the Seed-Corn in a proper Brine.

The Taste of Copperas is hateful to Worms; and they are no Way better guarded against than this.

It is supposed Hemp is destructive of them, or hateful to them, but Experience shews this to be an Error. I have seen Corn, steep'd in a Decoction of Hemp, devoured in the same Manner as if nothing had been done to it, and utterly eaten to Pieces.

Pieces. The best Preservative of all, is to sprinkle Lye over the Seed-Corn after steeping, and then to sift Lime over it, and sow it, well covered, with both. These Tastes continue with it longer than others, and are therefore more effectual.

C H A P. IV. *Of Slugs.*

WE have named the principal Destroyers of Crops while in the Ground ; and are now to consider the Devourers of them when they have sprouted ; and of these none is so fatal, so numerous, or so hard to be conquered, as the Slug.

By this Name the Farmer expresses the naked Snail. It is of two Kinds, a large black and a small brown one. The black is the greatest Devourer ; but the other is more apt to escape Destruction, because unseen, by being small and of the Colour of the Ground.

These are so very fruitful a Creature, that they will, in Places where there is any Shelter near, encrease faster than it is possible to destroy them.

A Gentleman of Veracity, who has a single Acre of Garden, assures me that he has, one Day with another, kill'd with his own Hand, sixty or seventy of these Creatures, Morning and Evening, during the Summer, for these twenty Years, and yet he finds to this Day as many as ever.

In Gardens these Creatures eat the Hearts of new-planted Kitchen-Herbs ; but in Fields they get a little within the Surface, and eat the first Shoots of the Crop.

The Stalk which is to support the Ear, together with the Rudiment of the Ear, and of every Grain it contains, lie in this first Shoot, and this is eaten off by these mischievous Creatures.

The small brown Slug is most destructive of Wheat and other Grain ; the great black Slug of Pulse.

The steeping of Seed-Corn is of no Benefit in this Respect, because no Taste from those Ingredients gets up to the Shoot. Therefore other Defence must be thought of against these Enemies.

Experience shews they are most frequent on Land manured with Dung ; and that fewest of all are found where the sharpest Manures are used, such as Lime, and the like.

Of all the Tastes that can be thrown among them, two are found most disagreeable to them ; these are Lime and Soot.

This will give the Farmer his first Instruction against them.

He

He knows the Time when they will come to be mischievous, and he has before him the Ingredients that can do most to prevent it.

Let him have some fresh and strong Lime ready ; and about eight Days after the sowing of the Corn, let him have one or more of his Chimneys swept for Soot. Let him mix together equal Quantities of the fresh Soot and Lime, and sprinkle it over the Ground.

This will greatly promote the Strength of the Crop, and at the same Time poison Multitudes of these Vermin.

If he can have the Advantage of a Shower about this Time, let him by all Means order the Soot and Lime to be thrown on soon afterwards : if not, the best Time is very early in the Morning ; because they are then out, and upon the Surface of the Ground. The Lime falling upon their Bodies, kills them ; and the Taste and Effect of it will remain several Days upon the Land, as a Preservative against those which have escaped.

In small Pieces of Ground, a Mixture of Soap-Lees and Tallow-Chandlers Greaves, destroys them utterly.

C H A P. V. *Of Grasshoppers.*

THESE are Enemies of which the Farmer is not so much aware, as of many others which do him less Damage. They are not so common in his Crops as the rest, which are in a Manner universal ; but where they come they are extremely destructive.

They feed upon the Shoot as soon as it appears above the Ground, and are very mischievous to the Summer-Corn, and other late sown Crops. They eat these down so very deep, that frequently there is never another Shoot made, but the Grain dies, rotting in the Ground.

The Remedy against these Creatures is of a peculiar Kind. It is found that they cannot endure the Taste of Bitters of any Sort. This is not singular ; for many Insects beside these, and even small Birds, are destroyed by those Bitters, which we take with Safety and Advantage, in the same Manner as if they were the most fatal Poison. An Infusion of Gentian will kill most of the small Birds ; yet, to us, it is a very wholesome and excellent Stomachic : on the other hand, there are Worms that feed on Pellitory of Spain, which is so hot we cannot endure it in our Mouths without Pain.

The Farmers who have, from Father to Son, a Tradition of this kind, boil Wormwood in Water, and sprinkle it over those

those Crops which the Grasshopper is devouring. But there is a much more powerful Remedy.

Coloquintida is the most hateful Bitter in the World; and a very small Quantity of it will give its Taste to a vast deal of Water. This should be sprinkled on the Crop, and will never fail.

C H A P. VI. *Of the Locust.*

THE Grasshopper naturally leads to the Locust, as it is only a smaller Animal of the same Kind; but this terrible Destroyer we are little acquainted with in BRITAIN. We were threatened with a Swarm of them some few Years since; and, as it is possible, they may come at some other Time, tho' we have all the Reason imaginable to hope not, it may not be amiss thus shortly to mention them.

They devour the green Crop of any Kind, and in any Degree of Growth; and when they come in such Swarms as to cover the whole Ground to a great Depth, there can be no Remedy. If they should ever threaten our Crops, it would naturally be in a less Number; and the Preservation would be in the Method just directed. Coloquintida should be boiled in Water, and the Liquor sprinkled over the Field. This would indeed be worth a Tryal against other Insects, particularly in Gardens; but it is not yet recommended upon Experience. It is a Taste so extremely nauseous, that probably no Creature would eat any thing wetted with it.

C H A P. VII. *Of the Caterpillar.*

Caterpillars are of innumerable Kinds, like the Beetles and their Maggots. They are the Young of the Butterfly-Species, and are as various in their Form, Size and Colours, as those winged Parents from whom they spring.

The Butterfly is directed by Nature to lay her Eggs upon some particular Plant; and there the Caterpillars are hatched. This Plant is to be their Food, therefore the Farmers and the Gardeners Crops suffer most because they are well tasted: and the Creature devours immoderately, and does vast Mischief.

After it has lived the appointed Time in this State, it spins a Web; and in that waits the Change into a Butterfly: thence it issues, like the Parent Animal, to lay the Foundation of another Brood.

Trees suffer as much as smaller Plants by these Creatures;
they

they will eat up the whole Quantity of their Leaves sometimes in a very short Time.

In the Fields the Pulse-kind are most subject to them ; and it is very essential to guard against them.

In Plantations of Trees their Nests should be sought, after the Leaves are fallen ; for many Kinds of them breed in this Manner in great Numbers, the Eggs remaining in the Nest or Bag all the Winter, and hatching just when the Leaves come out in Spring.

These Nests are generally at the Extremities of the Branches of young Trees, and the best Method is to cut off the Tip of the Branch and destroy them.

In Fields they have not this Course of Breeding, for what suffer most by them are the Summer Crops. When the Farmer sees them in any Number, or perceives by their Havock, that they are numerous enough to do him Mischief, his Remedy is this :

Melt some Pitch in an Earthen Pipkin, and put to it some Flower of Brimstone. Let it cool, and divide it into several Lumps.

Place small Heaps of Straw in different Parts of the Field, and on each lay one of these Lumps of the Pitch and Brimstone. Set Fire to the Straw, and the other Ingredients will melt and burn among it ; and every Caterpillar that is within the Influence of the Smoak, will fall off and perish.

If once be not sufficient, the same Practice may be repeated ; and if the Farmer be diligent, he need not fear Success. The Art is, disposing the Heaps in such Manner, that no Part of the Ground may be free from the Smoak.

In Gardens, and small Plantations of any Kind, use the following Method.

Boil some Tobacco in Urine, and add to it some Soap-Lees. Sprinkle where the Caterpillars are, and it will destroy them.

C H A P. VIII. *Of the Grub.*

WE have informed the Farmer in general, that the Grub is the Worm or Maggot produced by the Eggs of the Beetle. But there is one particular Kind of this Creature more destructive than the rest ; and when the Grub is mention'd without any particular Distinction, this Kind is meant.

This is a thick, short, whitish Worm, with a hard red Head, and six short Legs. It is found among the Roots of Barley and other Corn, and does prodigious Mischief ; eating
off

off the first Shoot just above the Husk. It feeds on the sweet Matter of the Corn, which is at that Time a kind of Pap, like Cream ; and leaves the Shoot to wither, and the Body of the Seed to decay.

This mischievous Creature is the Produce of that Insect we call the Cock-chaffer, which is so abundant in Hedges in Summer-Evenings.

It is an endless Task to think of destroying the Grub, because it lies at some Depth under the Ground ; but there is no great Difficulty in preventing the Danger, by destroying the old ones, to whose Eggs the next Brood must be owing.

We have directed the Farmer to defend himself against Beetles in general, by making a great Quantity of a stinking and smothering Smoke ; and the same Method is to be practised here.

He is to burn wet Stubble under all his Hedges ; and he will by this Means certainly either destroy or drive them from his Grounds.

C H A P. IX. *Of Flies.*

THESE are as innumerable in their Kinds as the Beetles or the Caterpillars, and no Insect is more destructive of the Farmer's Crops.

We have already spoken of the Damages they do to Turnips, and to other young Shoots of useful Plants, under the several Heads where those Articles are treated of at large ; we shall therefore refer the Reader to their proper Place for these particular Considerations ; but shall here give a general Account of this destructive Creature, and mention those Particulars which have not occurred before in their Place ; and with this close the Account of the Farmer's Insect-Enemies.

Among the Fly-kind, those which are the most conspicuous are the least hurtful ; the larger Species being, for the most Part, harmless, and the smallest, in the highest Degree, mischievous.

The Dragon-Fly, of which we have many beautiful Species, frequent about Waters, and which the Ignorant have distinguished by the Name of the Horse-stinger, has neither that, nor any other Hurt in its Disposition : a harmless Insect, form'd to wanton in the Fields of Air, to amuse us with its Beauty, and the Rapidity of its Flight ; and to do nothing to injure us. Its Brood are hatched in the Waters, where they are the Prey of Fishes, but never come in the Way of doing Mankind Damage.

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It is much the same with the rest of the large Kinds of Fly. They wander from Place to Place, and feed at Random upon lesser Insects, or upon useless Vegetables: but it is much otherwise with the small Sorts. They herd together in innumerable Drove, settle upon the Boughs of useful Trees or Plants, and destroy and pervert the Course of Nature by their Sucking.

Wherever these appear, the Method for destroying them is by proper Smoaks; for nothing else can properly and perfectly reach them; but there are Ingredients to be used in this Manner, which spread their Effects so far, and operate so powerfully, that it is scarce possible for these Destroyers to escape or to support themselves against their Influence.

Books written on these Subjects, abound with Receipts for Liquors to sprinkle over Plants covered with these little Destroyers; but these are trifling to the Method by Smoak, which is to be sent among them much more easily, and spreads its Influence more universally.

For the Destruction of Flies of a larger Kind, that have seiz'd upon a Crop, a Quantity of Feathers may be burnt among wet Straw, and these give so offensive a Flavour to the Smoak, that the Creatures will sometimes be driven away entirely; but oftener, when only driven away thus, they return again. The Method that is therefore most eligible, is to kill them.

The Smoak of Brimstone is, beyond all other Things, efficacious to this Purpose: there is a suffocating Steam attends it, which no Creature can endure.

This is therefore very proper when it can be used conveniently, but it does not spread its Effects far. A few Matches burnt under a Place where there is a small Parcel of these Vermin, will stifle them all, but there is no spreading the Influence of this over a whole Field.

As Sulphur is confined in its Sphere of Operation, there is a Drug called Orpiment, that is, of all known Substances, the most extended; and, happily for the Farmer, the Smoak of this is offensive beyond all other Things.

A Dram of this will make as much Smother as a vast Quantity of Straw, Stubble, or any other such Material; and the Smell is like that of Garlic, only vastly more offensive.

This is the Farmer's best Safeguard against the Fly, which seizes innumerable upon many of his Crops. He need not be afraid to use it, from its having been called by some a poisonous Substance; for that arises only from an Error: it is a common Thing to call yellow Ratsbane by its Name, but that is a Thing altogether different. Yellow Ratsbane is made
by

by Art; but the right Orpiment is found natural in the Earth: and the Farmer's great Care must be to purchase it of an honest Person, and to explain what he does, and what he does not mean.

There needs no Addition to this; and there is very little Trouble in the using it.

Let the Farmer, who has Crops over-spread with these Destroyers, take the Advantage of a Day when there is a little Wind; and place himself so that it may convey the Smoak he shall make directly upon his Crop. Then let him light a few Pieces of Charcoal, and set over these a Fire Shovel with an Ounce of Orpiment beat to Powder.

There will presently rise from it a thick white Smoak, of a most offensive Smell. He will not be incommoded by it, because the Wind drives it from him; but it will spread over a vast Space of Ground: if the Field be small, once burning will do; if larger, it may be repeated in two or three Places.

I have seen this tried in different Instances, and with various Effect. It hurts no Crop, and most Kinds of Flies are destroyed by it; but there are some it does not kill.

BOOK VII. SECT. II.

Of Damages from larger Animals.

CHAP. I. *Of Mice.*

FIELD Mice are as numerous as those of the House, and the Farmer often finds them as troublesome, and sometimes much more so. There are several Species of them; but they are all equally his Enemies, all feeding upon his Seed-Corn and Pulse in the same Manner, and are all to be destroyed by the same Means.

Drier Lands are more subject to this Kind of Vermin than those which lie wet; and of all the Kinds of sowing, that under Furrow most exposes the Seed to them.

In this Case, as the Furrows will fall somewhat hollow, they afford a Shelter to the Mice, at the Time of their committing all their Havock.

The Farmer seems to contrive for their feasting and Safety together in this Method; for the Corn or other Seed lies per-

fectly exposed to them, and they are not exposed to his Eye while they are feeding upon it.

In these Lands, I have with great Concern often traced the Path of those Devourers, and seen all eaten up, or carried away to some little Distance: for under the Covert of this Manner of Tillage, they will make their Nests and Granaries as it were in different Places; and the Seed shall be found stored up in one of these, that should have covered a great Space of Ground with its Shoot.

The Husbandman will by this see a great Disadvantage attending that Kind of Tillage; and he will know in what Fields he is most to fear these Enemies.

Though this Manner of sowing gives the Mice an Advantage, the other Way does not sufficiently secure the Corn from them. When it is sown in the common Way and harrow'd in, it is better covered; and there is a great deal more Trouble for them to get at it: but they are very industrious, and in this Case will dig after it, and tear up and destroy a great deal.

When it is sown under Furrow, they begin with it as soon as it is in the Ground; but when it is harrowed in, they wait for its first Sprout. This gives the Farmer an Advantage, because he knows exactly when he is to expect them; and it is a great Article of Safety, to know when to guard against the Danger.

The careful Husbandman is not in this Case to wait till he sees the Shoot of his Seed; for the Mice have very quick Eyes, and they will perceive it a Day or two before he does: he is therefore to look to his Ground a Day or two before the Time of its being seen covered with the young Shoot; and then, as he knows the Devourers will be about, he is to prepare for their Destruction.

Traps are a very poor Method of getting rid of these Creatures. There is no Way well worth his Consideration but Poison; and happily for him there are Drugs which will answer this Purpose of Poison to these Creatures, which are not literally and strictly Poison to ourselves. These he is to use, and they will sufficiently answer his Purpose. It would be a disagreeable Thing to be meddling with Ratsbane; but there is no Harm in handling the Ingredients he has to use.

In the first Place, let him consider what Fields from their Soil are most likely to harbour Mice, and in what Places he has known them most mischievous. Let him never sow these under Furrow, for that takes from him all Opportunity of

of attacking his Enemies: they work under Ground as it were, and will never come into the Way of his Poison.

When these Fields have been sown otherwise, and harrow'd over, the Mice must come upon the Surface and dig down for the Corn, and they will then certainly meet with any Thing he lays on the Ground for them.

Let him mix up a Peck of Barley Meal, a Pound of Powder of white Hellebore Root, and four Ounces of Powder of Staves-Acre; and when these are all mixed together by sifting through a coarse Hair Sieve, add half a Pound of Honey, and as much Milk as will work the whole into a Paste.

Let this be broke into Pieces, and scattered over the Field at the Time when the Mice are known to be coming. They will eat it greedily, and it is certain Death to them. There is nothing in any of the Ingredients disagreeable to the Taste when thus mixed; and every Morfel of it will be devoured. The Mice will be kept from digging after the Corn; and at the same Time killed by the Ingredients.

This is the Method to be used just at the Time of Danger; but the Farmer who has a Field pestered with these Vermin, will do well to be thinking at other Times also of destroying them.

They live at a small Depth under Ground, and there breed in Abundance. The Passage into their Nest is by a little round Hole, and these are easily seen in dry Weather.

On these Occasions the Farmer should go his Rounds with a Quantity of the Paste before directed; and wherever he sees a Hole throw in a Piece. A little Trouble of this Kind taken from time to time in the Heat of Summer when the Holes are most conspicuous, would utterly root them out.

CHAP. II. *Of Moles.*

THESE are subterranean Enemies of another Kind; but in their Way do as much Mischief as the former. We see their Hills in Pastures, where they work under Ground at a strange Rate, and are very hurtful; but the Damage they do to Corn is much greater, and frequently comes upon the Farmer quite unexpectedly. He knows that the Ants and the Mice will eat the Grain when newly sowed, and that the Slugs will destroy it when just shot up; but when these Times are over he is at Rest on those Heads. On the contrary, there is no Time at which the Mole may not destroy his Crop.

This Creature formed for living under Ground preys upon the Roots of Plants, and is fond in a particular Manner of those of Corn; but beside the Quantity they destroy by eating, they damage a vast deal more by undermining the Ground. 'Tis hard to be conceived what Havock one Way or other a single Mole will make in a Field of Corn; or in how little Time, one of these Creatures will burrow through a third Part of an Acre in a Day; and this perhaps at a Time when the Corn is half grown.

The driest Lands are the most subject to these Animals, but they will get into any; and there is no Creature of all the Number to whose Injuries the Farmer is exposed, against which it is so difficult to guard. There is no foreseeing when they will come; but it is very important to know of their being in the Ground as soon as possible, in order to stop the Destruction.

The only Caution in the Farmer's Power is to observe whether there are any there at the Time of plowing; and if there be, he is to use every possible Method of destroying them: if not, he is to examine whether the Lands nearest his own every Way be infested by them, or clear from them.

The freer they are the more likely he is to be clear of them; but there is no Certainty from this; for there are Times when they will come without any possible Manner of guessing from whence; and they will sometimes have done irreparable Mischief, before 'tis discovered they are in the Place.

The next Caution to this of knowing when to expect them, is the destroying them when found. They are a very defenceless Creature, and not very cunning. Their only Security is the being hid under the Surface; and they betray themselves in that Retreat by the Manner of their working.

The Husbandman, whose Crop is suffering by them, is to look for the Tracks where they have gone; and these he will easily see by the different Colour of the new turned up Earth.

He is to follow the Course of one of these Passages, when he has got Sight of it; and he is to dig cross Holes in it, and to watch the going out or coming back of the Mole. And wherever it is casting, to strike it through with an iron Instrument made for that Purpose. The Traps for catching them are also common, cheap, and of a plain Structure. Indeed the Destruction of this Creature is so easy, and so many are ready to undertake it at a trifling Price, that the Caution we first

first gave is the most important; which is the finding as soon as possible where they are growing mischievous.

In some Places the Farmers content themselves with driving them out of their Fields; and this is to be done by smoaking them, as other Creatures of a lesser Kind are destroyed.

To this Purpose they open their Passages in several Places, and burn Heaps of Straw and some Brimstone. This will drive the Moles out of a Corn Field speedily enough; but this is not a safe or eligible Method. It is only sending them out of one's own Ground into one's Neighbour's, who may in the same Manner drive them back again. This is only a temporary Relief; and there is none wise or effectual but their Destruction.

C H A P. III. *Of Birds.*

WE have gone through the Insect and creeping Tribe of Enemies to the Farmer; and come to the flying, These are as hurtful, and they must be guarded against by other Means. Those who are unaccustomed to these Things, will be surpris'd to see to how many Accidents, and to what a Variety of Devourers, the Husbandman's Crop is expos'd. They will wonder any Care preserves it from them; but certain it is that Care is necessary, or there will be put a poor Chance of escaping them.

Corn is open to a vast Variety of Birds, larger and smaller, from the Crow to the Sparrow; and they are continually seeking after it, from the Time it is out of the Seedsman's Hand in the Field, to the housing it up in the Granary.

The small Birds will follow the Sower, and one would think they would devour it as fast as it comes from his Hand: from that Time they are daily seeking after every Grain that does not lie too deep for them; and they will in Spite of the best Care eat a great deal.

When it is about to shoot, the fly Rook comes in. He perceives, as we have observed, the first Spire that gets above the Surface, before the Farmer's Eye sees the least Appearance of it; and he tears up a great deal. There is no Seed the Farmer sows that is not a proper Food for these Devourers. They fall upon all alike, and happy for the Husbandman it was, that in the old Way of sowing, a great deal more Seed was allowed than was needful for the absolute Growth.

The best Defence and Safety against these Devourers is the new Method of Husbandry.

Drill sowing gives great Security to the Seeds in general; and it limits the Time of the Danger of its being devoured, so that it is much more easy and cheap to protect it.

There is nothing of all that Loss of the Seed as soon as thrown from the Hand; nor can these rapacious Creatures pick it up Day by Day afterwards as it lies exposed; 'tis covered by that Practice, and the sole Danger is just when it begins to peep above Ground. If a Boy or two be employed just at that Time to fright the Birds away, it is naturally secure at all others.

The steeping of Seed is another Defence against Birds; for they will hate the Taste and neglect it.

A good Custom would be to let a Person follow the Seedf-man in the common Way with a Pistol, discharging it frequently among the Clusters that follow; hanging up any he chances to kill on a Stick by the Way.

This will defend the Seed in some Measure as sown; and the same Practice will be useful afterwards when it begins to sprout.

This will be needful whatever Method of Husbandry has been followed; for the Rooks and other Birds will tear up the Seed from any Depth where they see its first Shoot.

Therefore about a Fortnight after the sowing of Barley and other Summer Corn, and about six and twenty Days after the sowing of Wheat, Rye, and the like, in Autumn, let a Couple of Boys with Pistols be sent into the Field. Guns are unmanageable for such Persons, and the killing is not so much the Purpose as the frightening. Any Servant of the Farmer's may with a Gun kill a Crow or two, or half a Dozen Sparrows, in any other Place, and they may be stuck up in the Field. The Boys need only fire Powder, and they will thus weary and fright the Birds away.

This Method and no other will defend the young Crop. It is but for a few Days that it is required, and no Servants the Farmer employs in his whole Profession so well earn the Price he pays them.

Morning and Evening are the Times of Birds feeding. The Boys must be sent into the Field an Hour before Sun-rise, and must stay half an Hour after Sun-set; and these are the Times when they must be most vigilant. In the Middle of the Day there is least Danger, and the most Damage of all is done at Day-break.

We have thus given the Farmer a general View of all the Dangers to which his Crops are exposed from Animals; and the Methods found most successful in preserving and defending them against them.

One farther Damage there is to which he is exposed, and this is from other Plants; of this we are to treat in the ensuing Chapters.

BOOK VII. SECT. III.

Of the Damage from WEEDS.

CHAP. I. *Of the Nature of Weeds.*

WHEN the Farmer has been at the Charge of enriching and tilling his Ground, he expects the Advantages of his Labours and Expence; and wishes the Improvements he has made in the Land may give all its Fertility to his Crop: but he is to consider Nature sows while he is sowing; her Provision for keeping up the Species of Plants is very wonderful; their Seeds are scattered to great Distances, and where they fall they grow. While the Seeds of some Plants are winged with Down to make them float upon the Air, the Roots of others are so full of Life, that the least Morfel of them remaining in the Ground will grow.

'Tis not with Plants as with Animals: in these the Loss of a Limb or other essential Part cannot be restored, except in some few particular Kinds: but in Plants, while any thing remains the whole will be renewed.

Hence is the Origin of Weeds to be trac'd by the Farmer, and hence he will find them universal.

He is according to this distinct Manner of their Growth to divide them into two Kinds; the Perennial, or those which commonly rise from Roots left in the Ground; and the annual, which spring from Seeds brought on by the Winds.

A perennial Plant is one whose Root lives through the Winter, and shoots afresh in Spring. The Seeds of these may be brought on by Winds; but they are most pernicious when they rise from Roots; the Mischief lying deeper, and the Plant being stronger.

The annual are such as rise from scattered Seeds: these flower during Summer, and die when they have perfected their own Seeds, which Nature scatters for a succeeding Crop.

From this Distinction the Farmer will see they are to be the Subjects of different Treatment. The perennial Weeds ought to be got out in the tilling of the Ground, their Roots being torn up by the Instruments; the annual are to be cleared away by a particular Practice afterwards; that is by hoeing: for they are not in Being when the Tillage is performed.

Beside the Effect of Wind in bringing Seeds of these Plants upon the Ground, there is another Source from which many rise: this is from Seeds buried there in former Tillage.

The Seeds of these, like those of better Plants, will not grow unless they are near the Surface; but many of them will continue good when buried at a greater Depth, and grow when they are brought nearer the Air by Tillage.

The Farmer will see from this it is impossible to guard against Weeds, and that his Point must be to destroy them.

Every Method of right Husbandry assists in reducing their Number; but none can utterly destroy their Seeds or Roots.

The better Fences are kept up, the fewer Seeds will be brought into the Grounds; because the greater Part of those that are brought by the Winds, are stopped by the Leaves, and fall there. This is the Reason why Hedge Bottoms are, in Spite of their sheltered Condition, always so full of Weeds.

In the same Manner the better Tillage is used, the more the Roots of perennial Weeds will be torn up and taken out of the Ground; but in all this there will be still Room for some Encrease.

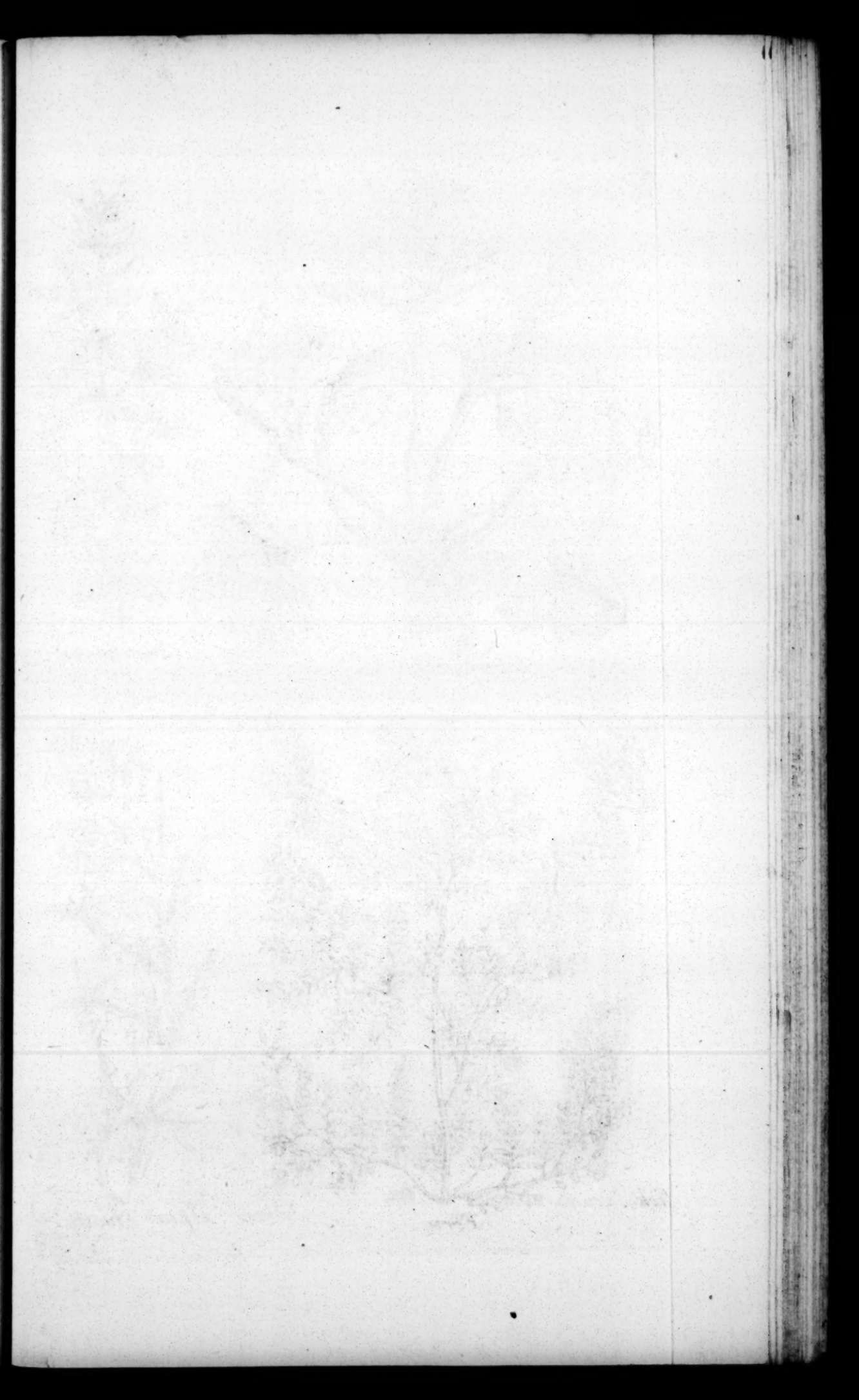
Some Seeds will come in, and some will be ripened upon the Spot; so that notwithstanding the best Care that can be taken to prevent their Growth, a great deal will also be required afterwards to destroy such as rise.

Weeds are in this Manner to be expected in all Places; and they will out-grow all Crops.

This rises from a plain Reason: they are Natives of the Soil and Climate, and will therefore thrive better in it, than such as are raised by Art.

It is a great Advantage in the Drill and Horse-hoeing Husbandry that they can from Time to Time be destroyed as the Crop is growing; and that every Time they are cut up the Ground receives a Kind of Tillage.

In





Thistle.



Couch Grass.

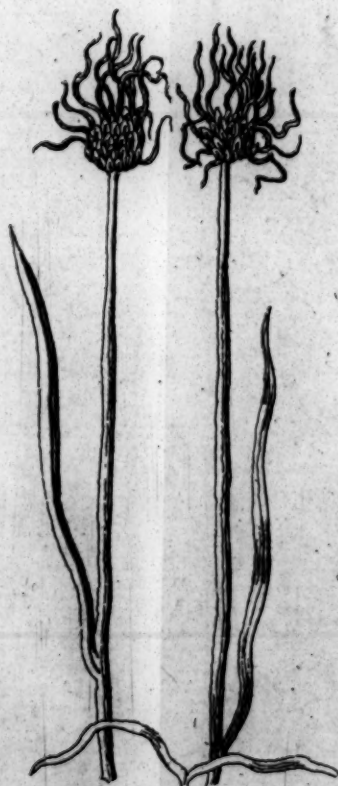
Perennia



The Colt's foot Flower.



Wild Oat.



Crow Garlic.



Broad leaved

ial Weeds.



t Flower .



Colts-foot Leaves .



Rest-harrow .



leaved Garlic .



Fern .



Spear Thistle .

Annual



Melilot.



Corn Marygold.



Sow-thistle.



ual Weeds.



Poppy.



Charlock.



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In the common Method they grow with the Crop: and as they are naturally more vigorous, they draw the greater Part of the Nourishment from it.

CHAP. II. Of the several Kinds of Weeds.

EVERY Thing that grows without being sown or planted, among a Crop that has been sown or planted, is in that Place a Weed. The whole Benefit of the Tillage was intended for the Crop, and this robs it of a Part.

In general those Weeds are most numerous which rise from Seeds; and those most difficult to be extirpated which come from Roots. *Sow-thistles* in Fields, and *Groundsell* in Gardens, are an Instance of the first Kind, and *Restbarrow* of the latter; a Plant whose Root is so tough that it will impede the Progress of the Instruments, according to its Name; and so full of Vigour in every Part, that the least Morfel slightly covered will grow.

But there are some which have both these ill Qualities of propagating quickly and abundantly by the Seeds, and spreading and rising also from their Roots.

Coltsfoot is an Instance of this Kind, its Seeds are winged with Down like the *Groundsell* or *Sowthistles*, and the Root is as tough and full of Life as that of *Restbarrow*; these are the most pernicious of all.

Couchgrass propagates almost entirely by the Root; but it spreads so fast and so far, that nothing is more prejudicial.

From this Review of the several Natures of Weeds, the Farmer will know how he is to conduct himself in this Respect.

Let him when he is about to enter upon the Tillage of a Piece of Ground, consider what are the Weeds upon it, and by that determine his Method of working: for all Lands the Horsehoeing Husbandry is preferable in this Respect to the other, but most of all where the Ground is over-run with perennial Weeds. Let him take Care he know these by Sight, and understand what he is to do by their Appearance.

If he sees the *Common Way Thistle*, this is one of those of the worst Kind, its Roots creeping and spreading, while its Seeds fly by Means of the Down.

Fern is another terrible creeping rooted Weed; and *Melilot* is hateful, not only by its abundant Propagation, but its abominable Flavour. Such as these hurt the Farmer two Ways; they impoverish his Crop, and give an ill Condition to the Grain. Wild Garlick does the same Damage.

Wherever

Wherever there is an Abundance of these Thistles, and such other of the rooted Kinds, let the Farmer understand that the Ground will cost him much more Expence than under any other Condition, whatsoever Method he follows; and that his best Practice is to tear them up with the four coultered Plow, to harrow away the Roots immediately after every plowing, and to work it up by the Drill and Horse-hoeing Method.

This will in a few Years perfectly clear it of the worst Weeds that can infest it, be they ever so abundant; and if he follow any other Practice, they may remain Torments to him throughout the longest Lease.

The deep Plowing we have directed, and the repeated Harrowings will tear up and draw off a very great Part of these Roots; but as any small Fragments will grow and soon encrease to any great Length, they would after this (be all the Care possible employed in it) rise among the Crop, and strengthen themselves in the Ground during its Growth: whereas in the Horse-hoeing Method, the very smallest Fragments as soon as they begin to grow will be torn up and thrown out in the Intervals, and very easily cleared from among the Rows of the Crops; and as these Intervals of the present Year are to be the Places of Rows of Crop in the succeeding, it cannot be but that the Ground must in a few Seasons be perfectly cleared from them.

We have upon many Occasions, and for various Reasons, strongly recommended this Practice in the preceding Parts of this Work; and we cannot but add this as one very essential Pre-eminence it has over the common Method, or any other ever brought into Use.

C H A P. III. *Of clearing the Ground of Weeds.*

THE Consideration of Weeds is very essential to the Husbandman, because scarce any of his Land escapes from being abundantly infested with them; and none is ever entirely free. They utterly destroy some Crops; and they never fail to injure others in Proportion to their Number and Nature.

The Hand-hoeing will, in some Cases, answer the Purpose with the annual Weeds, as the Horse-hoeing does with the others; but even this, in the common random Way of Sowing, is a Thing scarce practicable.

We have told the Farmer what he is to do in a Land overrun with the perennial Kind; and we shall suppose him now
about

about to undertake a Piece that is tolerably free from these, but is abundantly covered with the annual ones. In this Case, as well as the other, the Horse-hoeing Method is vastly preferable to any other, because it not only effectually destroys such as rise after the Sowing, but makes them useful as a Manure: but if the Farmer is averse to this, let him take a middle Course.

Where he sees this abundant Growth of annual Weeds, he may be sure there will be a proportional Increase among his Crop: they must be destroyed, or they will starve his Corn, by drawing to themselves the far greater Part of the Nourishment: in the common random Way of Sowing, nothing is so difficult as to get out Weeds in the Growth; but in this Case it would be impracticable: therefore if he will not admit the Hoe-Plough into wide Intervals, at least let him sow by the Drill with somewhat narrower, that his Crop may stand clear and well distinguished from the wild Growth; and that the Hoers may easily and conveniently clear the Ground between the Rows with Hand-Hoes.

This is an Improvement of the common Practice, and will be of great Service; because the Hoers, while they clear the Intervals between the Rows, may also draw up the Weeds by Hand that grow among the Crop in the Rows; but this is by no Means comparable in the Effect to the other Method.

The Hand-Hoers leave Parts of the Roots in the Ground, and after the first Shower there is a new Crop of the Weeds; but the Horse-Hoe, tearing up the Roots, admits of no such speedy Return.

These are the Methods the Husbandman will find most successful; but if he be so devoted to the old Method, that no Prospect of Advantage can lead him out of his beaten Tract, then his proper Recourse must be to a Summer's Fallow; and this must be carefully observed. The more the Ground is infested with Weeds, the more Care must be taken in the turning up the Ground.

A dry Summer will destroy a vast Number of them, when they are thus from Time to Time torn up as they rise, and expos'd to the Sun; but there are Seeds, that will lie under very little Disadvantages a whole Year without shooting, and on these the Fallow takes no Effect.

The wild Oats is of this Kind, and several others; for there are Plants whose Seeds naturally lie twelve or eighteen Months in the Ground.

These escape all the Farmer's Diligence in a Summer Fallow; they are not to shoot till the succeeding Spring, and then

then they come up with great Vigour, as if the fallowing had been a Preparation of the Earth for them.

Thus although a Summer's Fallow is the best Expedient the Farmer can use who will not follow the new Improvements, yet it is not to be compar'd in Efficacy to the Methods they offer for his Service.

It will destroy a great many Weeds, but the Horse-hoeing Method utterly extirpates all; and that without the Loss of the Season sacrificed to the Operations of Fallowing.

We represent these Things to the practical Farmer as they are, on these repeated Instances; and hope the several Proofs of Advantages of various Kinds attending on the Practice of the new Method, will, when he sees them thus candidly laid before him, induce him to follow it.

The Seeds that lie this length of Time in the Ground, and escape by that the Summer's Fallow, are not the only Source of a succeeding Year's Growth of Weeds; a vast Number are brought in with the Dung and other common Manures, and the great Quantity beside rising from Seeds, waisted in by Winds, join in shewing that a Method of Husbandry which destroys them while the Crop is growing, must much more perfectly answer the Purpose, than one by which they are only kill'd before the Sowing.

Dung, which is the universal Manure in most Places, is composed chiefly of the Stalks of Corn; and, among these, there go into the Litter the Stalks of Weeds and their Seeds; therefore while the Farmer is enriching the Land for his Crop, he is also sowing Weeds to reap the Benefit of it.

These will be sure to rise in their full Number, and they will thrive upon the newly-enriched Soil abundantly. They can only be destroy'd while the Crop is growing, because they only grow with it. The Farmer will see by this, as by the other Instances, that there is no Way of destroying Weeds suited to his Purpose, or that can be effectual, but the doing it while the Crop is growing.

He is sensible of this; and in some Cases attempts it, by weeding among his Corn: but this is a Method the worst calculated for real Benefit of all that ever were introduced into Husbandry.

The Feet of the Weeders must do harm, and it is often more than their Hands do good. The Corn standing irregularly, there is no avoiding trampling some of it down; and in other Crops, which more resemble Weeds in their first Shoot, there is beside the Damage of the treading them down, the
Danger

Danger of tearing them up; and great Mischief happens both ways.

This is the Case with the annual Weeds, and it is still worse with the perennial: they cannot be torn up, because that would tear up some of the Corn with them. All that can be done is the cutting off their Heads; the nearer the Root, the better; but still however near this is done, the Remedy is only slight, temporary and imperfect; the Root remains in all its Vigour, and new Shoots presently rise in the Place of the old one. These are commonly more numerous than the old, and consequently they draw more Nourishment. Thus what appears a Remedy, is, in these Cases, an Increase of the Disease.

All this is obviated by the Horse-hoeing Husbandry: that tears up and destroys all Weeds without any possible Damage to the Crop. This is plain to Reason, and it is found true by Experience; and with this last Recommendation, added to the many we have occasionally named before, we close this Part of our Treatise.

B O O K V I I I.

Of the poisonous and hurtful Plants native of this Kingdom.

IN TWO SECTIONS.

THE INTRODUCTION.

WE have thus, in a compleat Course of the Practice of Husbandry, to the utmost of our Power, acquainted the Farmer with every thing he ought to know, and every thing he ought to do, for the Success of his Business and Improvement of his Crops. We have occasionally, together with what he is to undertake, shewn him what he is to avoid, and there requires but the single Article we are here to treat of, to finish the Design; which, if the Execution have been at all proportioned to the Intent, and to the Assistances received for compleating it, we hope will be a Benefit to the Public and to Posterity.

In

In treating of the Disorders of Cattle, we have mentioned their eating unwholesome Plants; and it is these we are to consider more at large in this Place. This Kingdom does not afford many; but what there are the Husbandman ought to know, for the Security of his Stock, and of the young among his Family.

Instinct gives Creatures a general Direction not to feed on hurtful Things; but they sometimes neglect the Caution; Appetite in them, as well as in ourselves, getting the better of all other Admonition. To us who have Reason, this Instinct is not given; and while too young to exert it, we are in the Way of Danger; nor are we at any Time, without due Information, altogether above the Power of Accidents of this Nature.

It is for this Reason we shall here give the Husbandman the full and distinct Knowledge of what hurtful Plants will fall in his Way, adding to their Descriptions the Assistance of Figures, that he may destroy them wherever he perceives them rise.

B O O K VIII. S E C T. I.

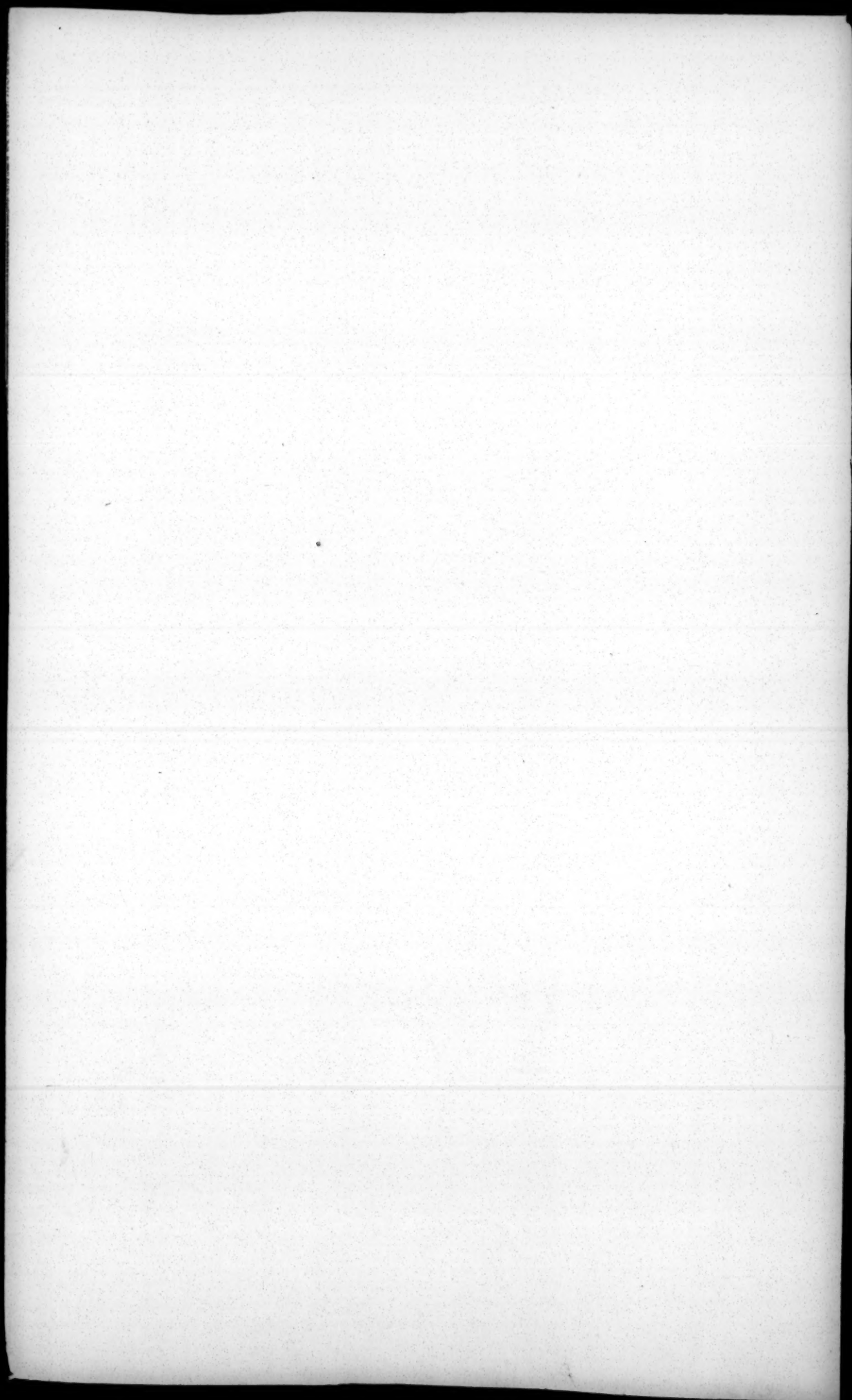
Plants absolutely poisonous.

OF these we are so happy, that there are no more than eight naturally wild in ENGLAND: the Farmer will, from the Figures and Descriptions, easily be acquainted with this small Number: we shall give him an Account of their Effects, not exaggerated by Fancy of false Histories, but from Experience and Authorities above the Reach of Question; and he will thus know what he is to avoid, both with Respect to his Family and his Cattle; and why he is to avoid them.

C H A P. I. *Of Henbane.*

HENBANE is a large spreading Plant: it is capable of doing great Mischief; and, unhappily for the Farmer, it is not confined to Woods or remote Places, but grows naturally upon Ditch Banks, and is common almost every where.

Nature,





Deadly Nightshade, See p. 369.



Hemlock, See p. 368.



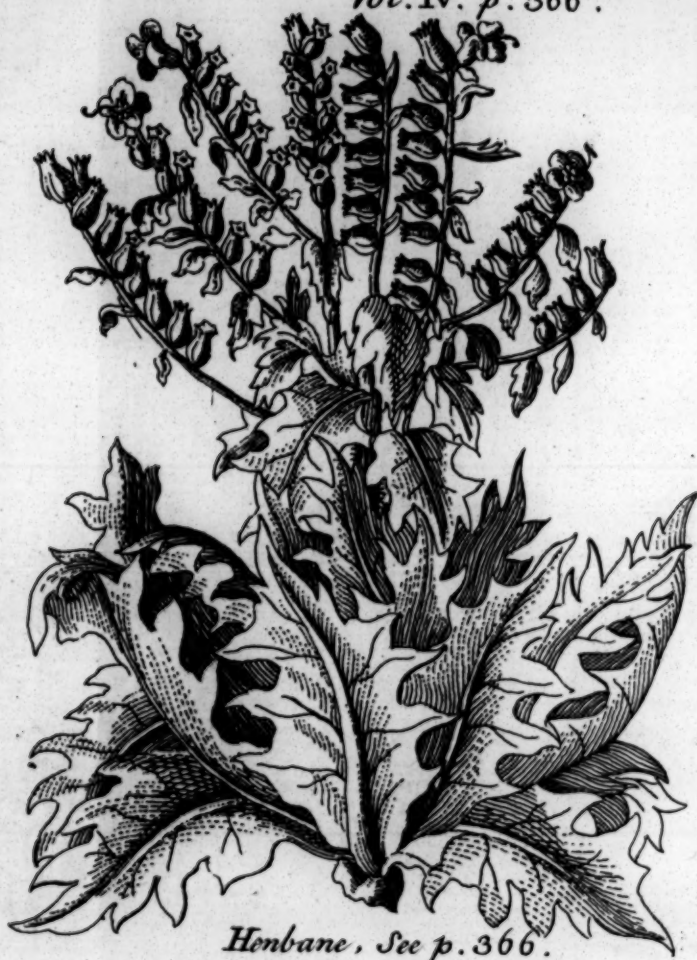
Herb Christopher, See p. 371.



Dog's Mercury, See p. 37.



p. 368.



Henbane, See p. 366.



p. 370.



Water Dropwort, See p. 370.

7

Nature, which has thrown it thus in the Way of Mankind, yet has stamp'd so strong a Mark of its Qualities in every Part, and given Notices of its hurtful Properties so evidently to all the Senses, that she seems to have rais'd a sufficient Caution against any Danger.

It differs from all other Plants in the Form and Hue of its Leaves: its Flowers are of a deadly dismal Colour; and the whole Plant forbidding in its Aspect. The Eye marks it for a Poison; and when offered to the other Senses, they answer in the same Language. Its Taste is filthy and nauseous, but this cannot easily come into Tryal; for its Smell, which will be perceiv'd first, is offensive and forbidding.

By this dismal Look, and this forbidding Smell, has Nature warn'd Men to beware of Henbane, tho' they see it frequent about their Dwellings: we shall prevent the Possibility of mistaking it for any other Plant, by adding the Description of its several Parts.

The Root is thick, long, and irregular in its Shape. From this rise eight or ten Leaves. They are very large, long, and of a whitish or a greyish green Colour. They are very deeply indented at the Sides, and of a stinking filthy Smell.

The Stalk grows up in the midst of these, and is whitish, hard, woody, full of Branches, and two Feet high. The upper Branches spread out very much.

Many Leaves grow upon this, like those that first rise from the Root, and of the same Smell.

The Flowers are numerous and large, but they are not conspicuous. They are hollow, like a Bell, and are of a dead Colour, vein'd in a very curious Manner with Purple.

After these come short thick Seed-vessels, which are full of small brown Seeds.

Every Part of this Plant is poisonous, and it destroys People by throwing them into Drowsiness, like a Lethargy, with Convulsions.

Cattle will sometimes eat the young Leaves of it; and this throws them into the Sleepy Evil, described before: if they have eat a great deal no Medicines can recover them. Hogs will grub up the Root, and it affects them in the same Manner.

Chickens will pick out the Seeds; and if they eat a large Quantity, they die by it. This is the Reason of its Name *Henbane*.

These are sufficient Reasons why the Farmer should let none of it grow near his Fields; but there is yet greater Cause for tearing it up in his Yard where it is very common.

There

There have been Instances of Country Fellows eating the Roots by Mistake ; and they have dy'd in the most miserable Manner in Convulsions, and with gnashing of their Teeth.

The Seeds of white Henbane which are used in Medicine, are those of a different Plant. This is altogether poisonous.

C H A P. II. *Of Hemlock.*

THIS is another of those poisonous Plants, which Nature, for Reasons to us unknown, has made to grow in great Abundance near our Habitations.

It is not characteris'd like Henbane, by a peculiar forbidding Aspect ; yet it is a gloomy-looking Plant, and by no Means inviting to the Eye. Its Smell also is heavy, and seems to the most ignorant Person unwholesome.

There is a Sort of Hemlock which grows of itself in Gardens, and resembles Parsley ; but this, tho' a very unwholesome Plant, is not the poisonous Kind. That is the large Kind which grows wild in Hedges ; and it is sufficiently distinguished by its Height, its Aspect, and its painted Stalk, to prevent any Mistake to the Farmer, who shall have observed its Description and its Figure.

The Root is white, thick, long, and of an unpleasant Smell.

The Leaves that grow from this are very large, two Feet broad, but divided into innumerable small Parts, in a regular and beautiful Manner ; and they are of a dull and blackish green.

The Stalk grows up in the midst of these, and it is two Yards high, and as thick as a Child's Arm. It is of a deep dingy green, but painted in a very surprising and beautiful Manner with Purple, so that it resembles the speckled Skin of a Snake.

The Flowers are white, they are small singly, but they stand in thick and large Clusters at the Tops of the Branches.

The Seeds are roundish, of a pale green Colour, and striated. Two come after every Flower.

There are several other Kinds of this, beside that first mentioned, and the present ; especially a very singular one with a thick Stalk, that grows in Waters. They are all of a poisonous Quality ; but this common Hedge Kind worst of all.

The Stalks are the most poisonous Part ; and next to them the Seeds. Some pretend the Root has scarce any bad Qualities ; but this is not confirmed upon sufficient Experience.

The

The ATHENIANS extracted the Juice of Hemlock from the lower Parts of the Stalks before the Plant rose up to flower; and with this Poison they executed Criminals instead of hanging. SOCRATES died by this Dose.

The Knowledge of the poisonous Qualities of Hemlock is so common, that we do not hear of any bad Effect among our own Species who are guarded against it: but many of those Diseases of Cattle which perplex the Farmer and the Farrier, and at length end in the Creature's Death, are the Effects of eating the young Shoots of this Plant. Some Birds feed upon the Seeds without Hurt; but they are fatal to other Creatures.

C H A P. III. *Of Deadly Nightshade.*

THIS is a Plant not so common about Towns and Houses as the others; but wherever it is seen should be rooted up, for it is fatal to Children. Nature, which has not planted this in the Way of Men so much as the other two, has not been careful to mark it, as those, for a Thing to be dreaded. On the contrary, it is an extremely beautiful Plant, yet with a somewhat melancholy Aspect.

The Root is long and thick, and it creeps under the Surface of the Ground.

From this rise many large and broad Leaves of a deep green Colour, and not at all notch'd or divided at the Edges.

The Stalk is round and thick, divided into many Branches, and a Yard high. It is full of Leaves like those from the Root, and toward the Top has many Flowers.

These are large, hollow like a Bell, and of a dusky Purple Colour.

After these come Berries which are large, and of a very tempting Aspect; they are of a shining and jetty black, and are as big as large black Cherries. They are ripe in July and August.

Children are tempted to eat these, and they are always fatal. A single Berry will bring on Convulsions; but they seldom stop with one or two. They commonly die miserably a few Hours after eating them.

I remember an Instance of two Children in NORTHAMPTONSHIRE, who eat immoderately of them and did not live to get Home. They were track'd, from the Plant to the Place where they fell, by bloody Stools, and there died in Convulsions.

C H A P. IV. *Of Water Dropwort.*

THIS is a Plant, which, like the former, has been fatal to many Persons who have been tempted by the cleanly Look to eat of it; and which the Farmer should know, that he may guard against it with the utmost Care. The Root in this Plant possesses the greatest Degree of Poison.

It always grows by Waters, and is very common in most Parts of the Kingdom.

The Root is composed of several long and large Pieces which resemble Parsnips in Shape and Colour, and are of a sharp Taste.

The Leaves that rise from these are large, and of a pale green, and they are divided into a great Number of Segments.

The Stalks rise several together, and are upright, divided into many Branches, and a Yard high.

They have several Leaves upon them like those from the Root, and of the same faint Colour.

The Flowers are small and yellowish; they grow in great Tufts at the Tops of the Stalks, and after every one of them there come two small Seeds.

The Roots when they are fresh taken up have an inviting Aspect: they run out a white Juice like Milk when cut; and this presently after turns yellow.

Many have eat of them, and all died. We have Instances of the sad Effects from very early Time; and within these few Years the same fatal Scene has been repeated. They take the same Effect whether raw or boiled; and those who eat them die raving and in Convulsions.

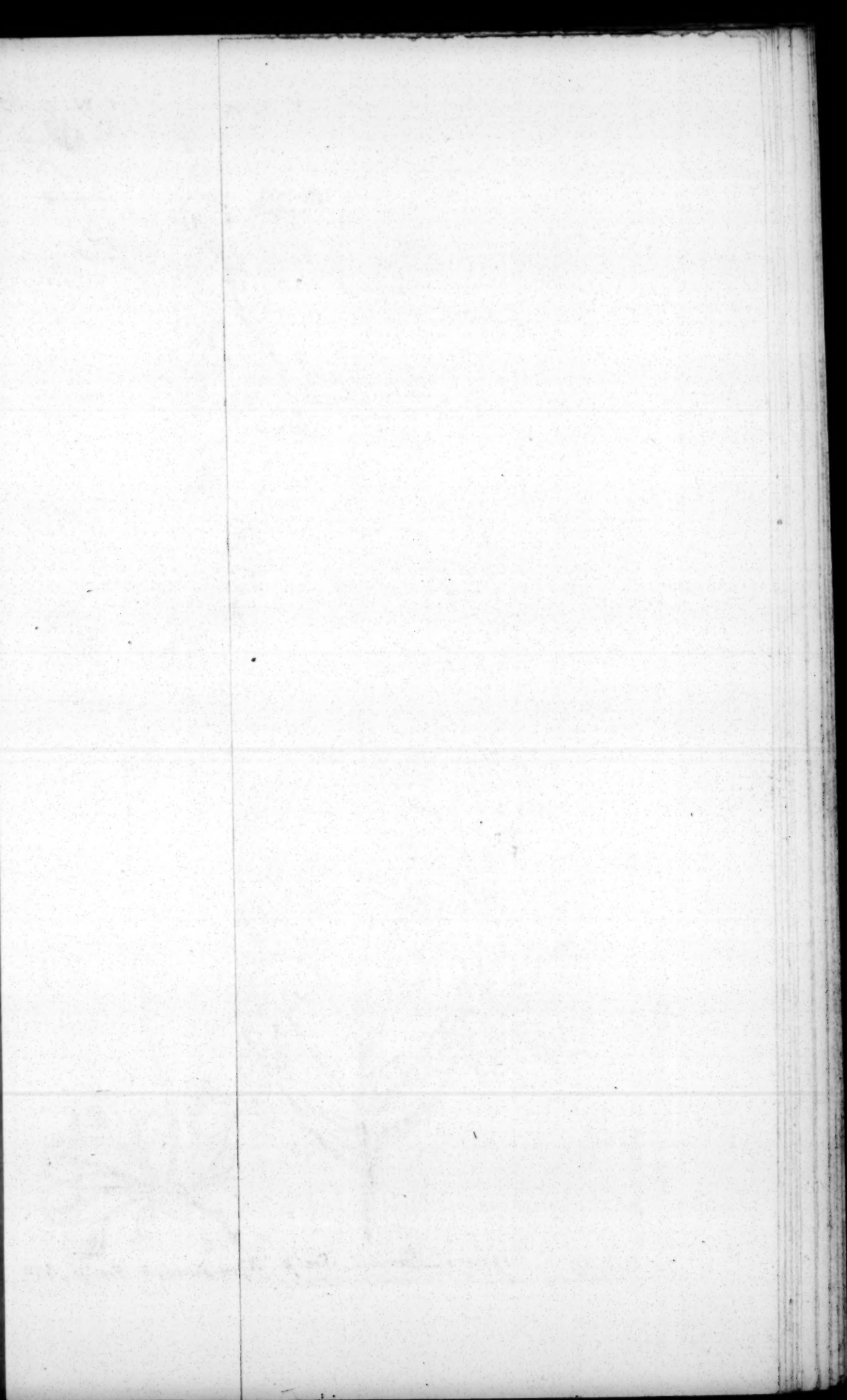
C H A P. V. *Of Dog's Mercury.*

THIS is another of those Plants which tempt the Ignorant by their pleasing Aspect, and are in their Effects fatal. The whole Herb appears very inviting; it is fresh and green at a Time when every thing else is dead; and many have eat it raw or boiled, and perished by it.

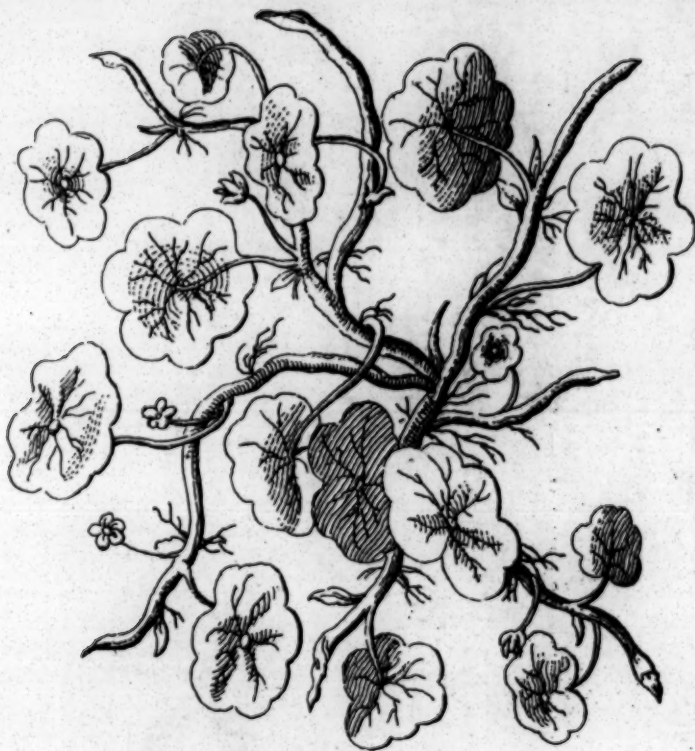
It is a Plant common under our Hedges, and on which Nature has stamped no Mark of Caution: on the contrary it has a very alluring Look.

The Root is slender and long; it divides into many Branches, and spreads under the Surface of the Ground.

The



PLANTS not absolutely



White Rot, See p. 373.



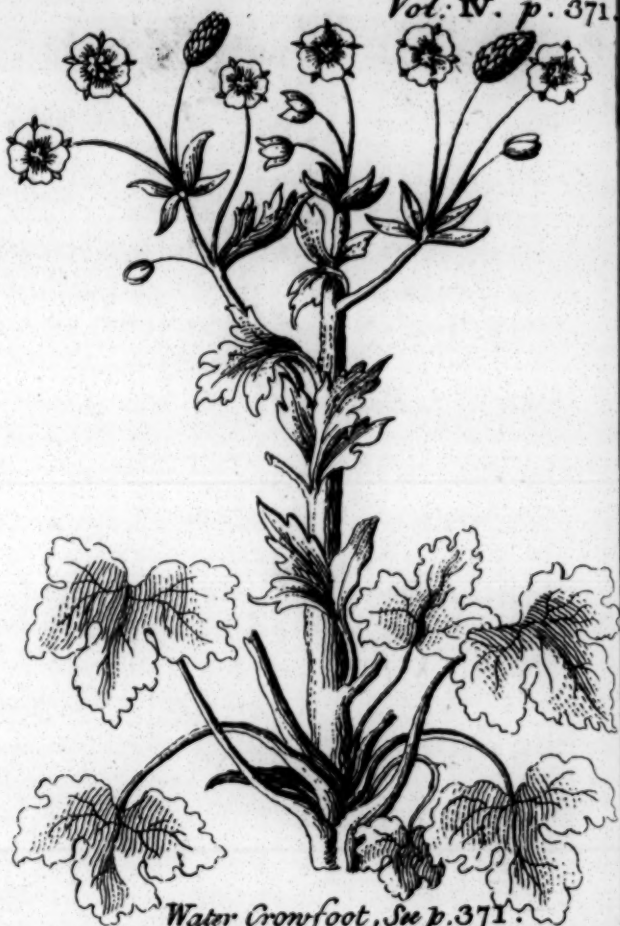
Spurge-Lavell, See p. 375.

ely Poisonous, but Hurtful.



The Yew Tree, See p. 372.

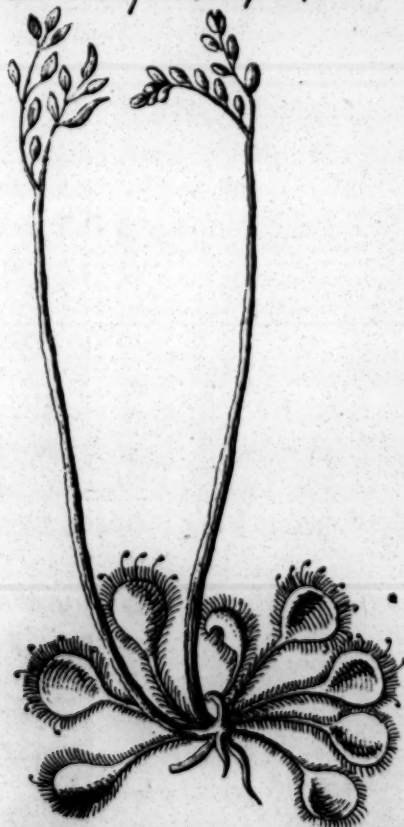
Vol. IV. p. 371.



Water Crowfoot, See p. 371.



Lousewort, See p. 375.



Common Sundew, See p. 374.

The Stalks are round, upright, not at all branched, of a faint green, and a Foot high.

They are almost naked toward the Bottom, but nearer the Top there stand many Leaves; these are long notched at the Edges; and they are of a very bright pleasant Green.

The Flowers are inconsiderable. On some Parts there stand Spikes of a greenish Colour, and on other Seeds, which are as it were double.

The Plant is in full Vigour early in Spring, and its fresh, green, and wholesome Look has tempted many to boil it for Food. Whole Families have been poisoned by it. The Children have generally died; sometimes the Farther and Mother have recovered; but in other Instances all have perished together. They die in Convulsions, and in the greatest Agonies.

C H A P. VI. *Of the Herb Christopher.*

THIS is a Plant as fatal in its Effects as any; but very happily it is found in few Parts of this Kingdom, and there generally in Woods, and far remote from Dwellings.

The Root is long, thick and whitish.

From this rise several large Leaves, supported on long, redish Foot-stalks. Each Leaf is divided into many small Parts, or is as it were composed of many small ones; and it is of a deep green Colour.

The Stalk rises in the Midst of these, and is round, upright, redish, and two Feet high.

Several Leaves grow upon this, which in all Respects resemble those from the Root, and are when rubbed or bruised of an unpleasing Smell.

The Flowers stand in long Clusters upon small Stalks growing at the Leaves; they are small and White.

The Berries that follow these hang in the Manner of Bunches of Currants, and they are of a shining black Colour. They are ripe in Autumn.

Children who have gone out to gather Blackberries have been tempted to eat these, and have in Consequence died in Convulsions. The Plant has been from this named Baneberries. The young Shoots also poison Cattle.

C H A P. VII. *Of Water Crowfoot.*

EVERY one knows the common Crowfoot of the Meadows, which Children call Butter Cups: this is of a

burning and caustick Quality; but there is one Kind of it which has been sometimes eaten, and has never failed to prove a very desperate Poison, destroying People in a particular and very frightful Manner. This Kind is common in watery Places, and is perfectly different from all the others, and indeed from all other Plants; so that the Husbandman will have no Difficulty in knowing it at Sight, by the Means of our Description and Figure.

The Root is composed of a great many fine white Threads.

The Leaves rise from this, a great many together, and they are broad, of a roundish Shape, but irregularly divided about the Edges into three or more Parts: they are smooth, of a shining Surface, and of a pale yellowish green Colour.

The Stalk rises up in the Midst of these, and is very thick, fleshy, of a pale green Colour, two Feet high, and divided into a great many Branches.

Several Leaves grow upon this which in all Respects resemble those from the Root, and are, like them, of a pale green Colour.

The Flowers stand at the Tops of the Branches: they are very small and yellow; and they resemble the common Crowfoot Flowers in Shape, but they are paler coloured.

The Seeds follow these, and are small and green; they stand clustering together in a Kind of oval Heads, and easily fall off when touched.

The Plant is common about the Edges of Ponds; and where Water has stood in Winter. Its Leaves are up early in Spring, and by their Freshness tempt Cattle and sometimes Men to eat them. They are the Causes of many of those Disorders which affect Cows and Oxen in the early Season.

Their Effect on Mankind is terrible: Death is a certain Consequence, and they die laughing.

C H A P. VIII. *Of Yew.*

THE Yew is a Tree too well known to need a long Description. Its Trunk is covered with a redish Bark. Its Branches spread irregularly, and its Leaves are composed of many small and narrow ones, which stand regularly on the two Sides of a Stalk in Rows, and are of a blackish Green.

The Fruit is of a particular Form and Appearance; it is composed of a green Button placed in a red juicy Cup, resembling the Husk of an Acorn.

The

The Tree is wild in our Woods in many Places, and is planted also for Ornament, being an Ever-green.

Children eat the juicy Part of the Fruit, which happily is not poisonous, or in the least of Kin to the rest of the Tree.

The Farmer's Care must be to keep his Cattle from the Leaves. They will frequently eat the Clippings thrown out of Gardens, or the young Shoots when it is planted where they can get at it.

When they eat but little of it, they fall into Disorders which often end in their Death: but when they swallow it in a larger Quantity, they die presently.

B O O K VIII. S E C T. II.

Such as are not absolutely poisonous but very hurtful.

C H A P. IX. *Of White Rot.*

THIS is a little obscure Plant, which often grows in great Abundance where it is little minded, and is the Cause of very terrible Mischief to the Farmer.

It consists principally of a Parcel of Stalks which lie upon the Ground, and spread themselves about in a very irregular Manner. They are as small as a Packthread, and of a pale whitish green. Sometimes they rise a little upwards, but rarely.

These Stalks send down little Tufts of fibrous Roots in various Places; and generally where these shoot from the lower Part, there rise also, from the upper Side, Leaves.

These are as large as a Half Crown-Piece, and of a round Shape, but indented irregularly at the Edges. The Stalk which supports them, is long and slender; and it is inserted not at the Edges, as in most other Plants, but in the Middle.

The Colour of the whole Leaf is whitish, and it is of a thin Substance.

The Flowers are very small and inconsiderable: they are of a pale Colour, and they stand on slender Foot-stalks rising from the Bosoms of these Leaves, or the Part where their Foot-stalk joins to the main Stalk. The Seeds are small and brown.

This

This is the whole of a Plant, whose low Condition renders it unsuspected by the Farmer, while it is the Ruin of his Flock.

It is very common in marshy Grounds, where it runs close to the Bottom, and is hid among the Grass.

The Sheep find it, tho' their Owner does not perceive it; and they eat of it abundantly among the Grass, being pleas'd with its sharp Taste. The Consequence is, their falling into that terrible Distemper the Rot, from which few, that have swallowed any large Quantity of this Herb, escape.

C H A P. X. *Of Sun-dew.*

THIS is another of those Plants which is fatal to Sheep; and which, in the same Manner, is often overlook'd by those who know its bad Effects; by Reason of its Smallness: but in this they are the less to be excus'd, because, tho' a very little Plant, its Singularity renders it conspicuous.

It is but about six Inches high, but strikes the Eye at first, being all over of a red Colour; and, upon a closer Examination, it surprises yet more, by being covered with large Drops of Water in the most violent Heats: it hence obtained the ENGLISH Name Sun-dew; and it is also called frequently *Rosa Solis*.

The Root is composed of a few small Fibres.

The Leaves rise in a little Tuft eight or ten together. Each is supported on a long slender Foot-stalk. They are of the Bigness of a Silver Penny, round, of a red Colour, but covered with very long and stiff yellow Hairs: upon these rest the great Drops of Water.

The Stalk rises in the midst of these, and is about six Inches high: it is upright, very slender, and has no Leaves upon it. It generally divides into two Parts at the Top, but otherwise it has no Branches.

The Flowers grow in a Row at the Top: they are small and white, and they seldom open perfectly. The Seed-vessel is short, and the Seeds are very small.

This Plant grows, like the former, on boggy Grounds; and it has, like that, a sharp Taste, for which the Sheep like it. They eat it too frequently, and its Effects are the same as those of the former. It brings on the Rot; and those that have eat much are incurable.

C H A P. XI. *Of Loufewort.*

THIS is another Inhabitant of the wet and marshy Grounds, which is hurtful to Sheep in a terrible Manner, though not so fatal as the others.

It is a much larger Plant than either of those, and easier seen, but it is as often overlook'd or disregarded.

The Root is compos'd of a vast Number of Fibres, which run deep into the Ground.

The Leaves rise in little Tufts from this, and they are small, and beautifully divided into a Number of lesser Parts. They are of a fleshy Substance, and of a faint green; but very often they are brown, and sometimes redish.

The Stalks are weak, and do not stand well upright: they are six or eight Inches long, and of a redish Colour. They have many Leaves on them, in all Respects resembling those which grow from the Root; and at their Tops stand the Flowers.

These are gaping, and of a full red; and they stand in redish and streaked Husks.

All our wet Meadows abound with this Plant. Its juicy Substance and Taste allure the Sheep to eat of it; in those Places especially where there is but little Grass, which is too common a Case where this Plant is abundant; and it throws them into many Disorders.

There is no Herb that has so speedy, evident, and certain an Effect in fouling the Blood. The most healthy and clean Flock, will, in a Fortnight, grow scabby and scurfy upon the Skin; their Wool will be loose, and they will be over-run with Vermin.

We have, in a preceding Part of this Work, delivered the Method of curing this Disorder; and the Farmer must be careful to observe the Direction of removing the Sheep under Cure to a dry upland Pasture. Those are Places where the Plant cannot grow; and there is no Security but that of the Creature's not feeding upon it, while under Cure.

C H A P. XII. *Of Spurge-Laurel.*

THIS is a shrubby Plant of a very pleasing Aspect, and worthy to be introduced as an Ornament into Gardens; but it is one that the Farmer should extirpate carefully from his Fields when he happens to have it. The singular Appearance

Appearance renders it easily known, and it is only found on hilly Grounds.

The Root is composed of several long and tough Fibres.

The Stem is as thick as a Man's Thumb; and it is covered with a brown Bark.

Toward the Bottom it is naked; but there are numerous Leaves about the upper Part. The whole Shrub is three or four Feet high; and the Leaves grow principally at the extrem Ends of the Branches.

They are long, broad, and of a firm Substance: their Colour is a deep green; and they in some Measure resemble the Leaves of the common Laurel.

The Flowers grow in Clusters below the Leaves, and they are small and green.

After them come Berries, which when ripe are black: they are of a longish Shape, and have a single large Kernel.

It is frequent on waste Ground in hilly Places in many Parts of ENGLAND, and flowers very early in Spring.

Cattle are tempted by the Freshness of the Leaves to taste them; and they are so sharp that they inflame their Mouths. Some will eat them in small Quantities, and the Effect is terrible; they bring on the most violent Purgings with bloody Stools; and often these Complaints resist the Power of all Remedies, and terminate in the Creature's Death.

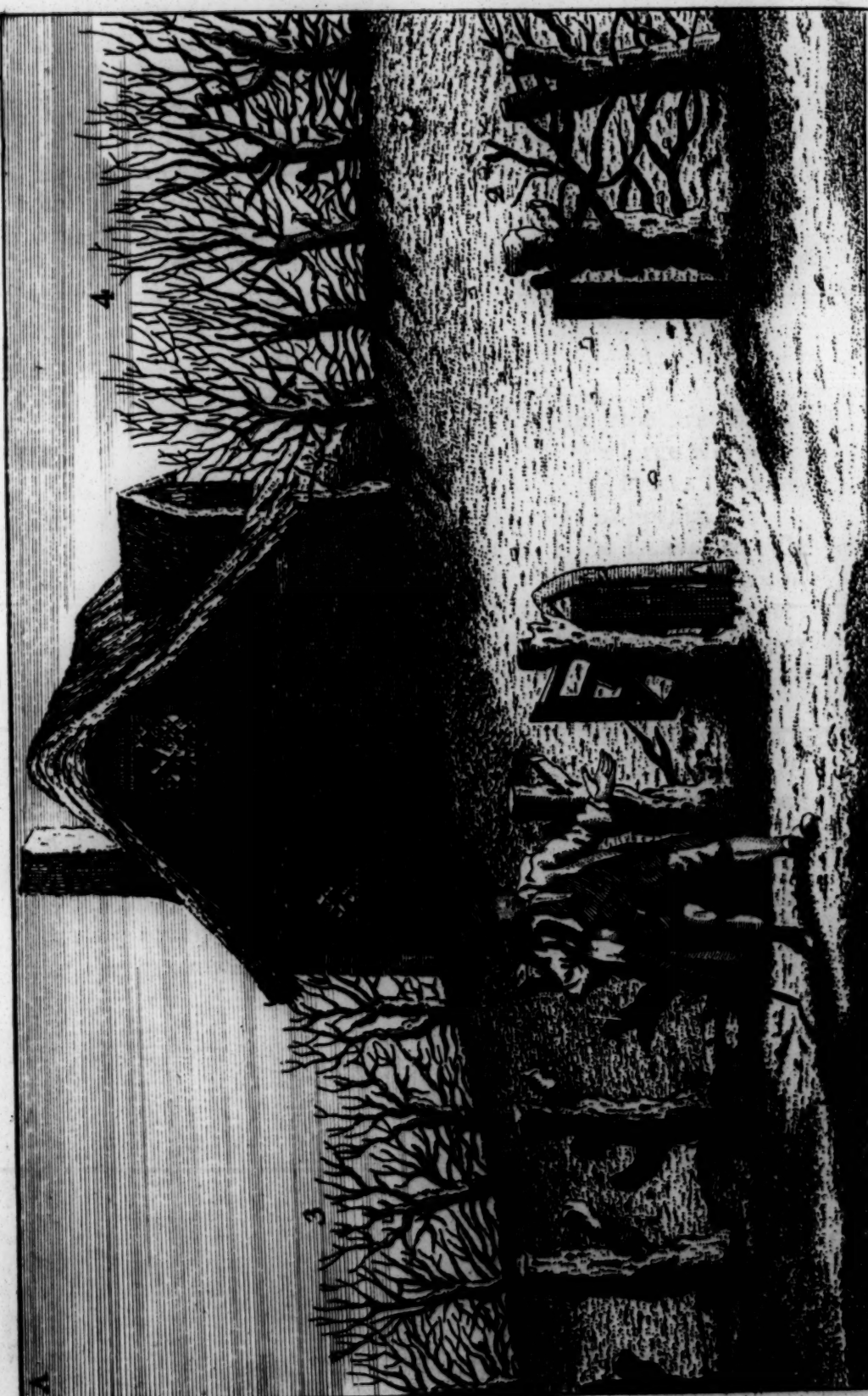
I had in the Year 1740 an Instance of this in three Cows, which had been seen eating the Tops of this Shrub in APRIL. They all fell into these Purgings, and though every Method was used that could be thought of, all three died.

We have elsewhere in its Place informed the Husbandman in what Manner he is to undertake the Cure of these Disorders; but it is much better to prevent them by rooting out such hurtful Plants, as are their worst Cause.

APPENDIX.







A P P E N D I X.

The Proprietors of this Work having been favoured by an unknown Correspondent, with this Proposal for the Improvement of Fences, give it to the Publick in the Author's own Words; with a Plate designed by Mr. W A L E, from his Original Drawing.

A Proposal for the Improvement of Hedge Fences.

INstead of cutting the full grown Hedge Wood to the Root, on new fencing an Inclosure, and defending the naked Bank with a dead Stake wreathed Hedge, according to the present Practice, this Proposal is made to introduce the Use of a Pollard Hedge.

To illustrate the Description of this Fence, Reference must be had to the Plate A.

The Structure of the Pollard Fence.

N^o 1. Are Stems of the full grown Hedge left standing four Feet high from the Bank, at proper Distances; and it would be still an Improvement to have these Stems left standing two, three, or more, deep laterally, as well as in the Line of the Hedge.

N^o 2. Are the same Stems or Pollards interwoven with some of the Lops of the old Hedge to thicken the Fence.

N^o 3 and 4. Are the same Stems or Pollards of some Years Growth after cutting Pollard wise.

The Use and Advantage of a Pollard Hedge Fence.

1st. The Pollard Hedge will yearly grow thicker and stronger. Cutting the Hedge to the Root renders the Shrub weak, and subject to decay: whereas leaving Pollard Stems with their lateral Branches (which must carefully be preserved) to the Root, gives Vigour and Spirit of Growth to the Plant; and a seeming Sollicitude to recover its late Mutilation, by multiplying at every Eye of the Stem, Branch, and Root: this it does so profusely, that in a very few Years the Fence will be as difficult of Access, as a Wall cover'd

with Thorns; and at length the Pollard Stems, &c. will grow so obstinate, that the Strength of a Horse will be too weak to make a Breach in this stubborn Rampart.

Every Hedge, how weak or slender soever at present, may, with great Ease, be nursed into the most stubborn Pollard Hedge: but the Farmer must avoid lopping it too often, lest thereby the Pollard Stems fail to increase in Bulk.

2dly. The Pollard Hedge yields to the Tenant, more Fire Wood than any other Kind. It also yields a Fence that will require no Expence to maintain, and demands little or no Wood for Brush Stakes or Copping, as are expensively required in the Case of a dead Stake Hedge.

3dly. The Pollard Hedge will prove profitable to the Owner, as well as the Occupier of the Land.

At the End of a Lease, Fences are generally down, and decayed; and the new Tenant will require them to be repaired at the Owner's Expence. Many Owners have felt the Deduction of a Year's Rent in this Article: let this Intimation therefore be remembered by Land Owners, that it will be profitable to themselves, and Tenants also, to fence their Lands, in their Leases, with Pollard Hedges.

The Editor of this DUBLIN Edition of the Compleat Body of HUSBANDRY, having procured some Plans of small Farm Houses, which he is advised are much wanted in IRELAND, hath caused the same to be engraved, and annexed the following Explanation of them.

No. I.

The Plan and Elevation of a Cabbin of one Floor.

	REFERENCES. See PLAN.			Feet	Feet
A Passage	—	—	—	12	by 6 .
B Kitchen	—	—	—	12	— 12
C Bed Chamber	—	—	—	12	— 12
D Parlour	—	—	—	12	— 12
E Larder	—	—	—	12	— 6
F Bed Chamber	—	—	—	12	— 6

No.

No. II.

The Plan and Elevation of a larger Cabbin of one Floor,
with Out-Houses.

REFERENCES. See PLAN.				Feet	Feet
A Passage	—	—	—	12	by 6
B Kitchen	—	—	—	12	— 12
C, C Two Parlours	—	—	—	12	— 12
D, D, D, D Four Bed Chambers	—	—	—	10	— 9
E Milk Room	—	—	—	12	— 6
F Larder	—	—	—	12	— 6

No. III.

The Plan and Elevation of a Farm House of two Floors.

REFERENCES. See PLAN.

First Story.				Feet	Feet
A Passage	—	—	—	12	by 6
B ₁ , B ₂ Two Parlours	—	—	—	12	— 10
C Kitchen	—	—	—	12	— 10
D Drawing Room	—	—	—	12	— 10
E Stairs	—	—	—	12	— 6
Second Story.					
A, B ₁ Great Room	—	—	—	18	— 10
B ₂ , C, D Bed Chambers	—	—	—	12	— 10

No. IV.

The Plan and Elevation of a Farm House of two Floors.

REFERENCES. See PLAN.

First Story				Feet	Feet
A Passage	—	—	—	6	by 3
B Kitchen	—	—	—	12	— 12
C Parlour	—	—	—	12	— 12
D Larder	—	—	—	6	— 6
E Cellar	—	—	—	15	— 6
F Milk Room	—	—	—	7	— 6
G Scullery	—	—	—	6	— 6
Second Story					
A, A Two Anti-Chambers	—	—	—	12	— 12
B, B Two Bed-Chambers	—	—	—	15	— 6
C, C Two dark Closets	—	—	—	6	— 3

Note, Under the Stairs is Room for a Bin that will hold two Hogsheads in Bottles; and over it may be made a useful Place for the Butler.

No.

No. V.

The Plan and Elevation of a small Farm House of one Floor.

	REFERENCES.	See PLAN.	Feet	Feet
A Parlour	—	—	12 by	12
B Kitchen	—	—	12—	12
C Bed-Chamber	—	—	6—	12
D Cellar	—	—	6—	7
E Milk Room	—	—	6—	7
F Larder	—	—	6—	8
G Passage	—	—	4—	6
H Passage	—	—	3—	6

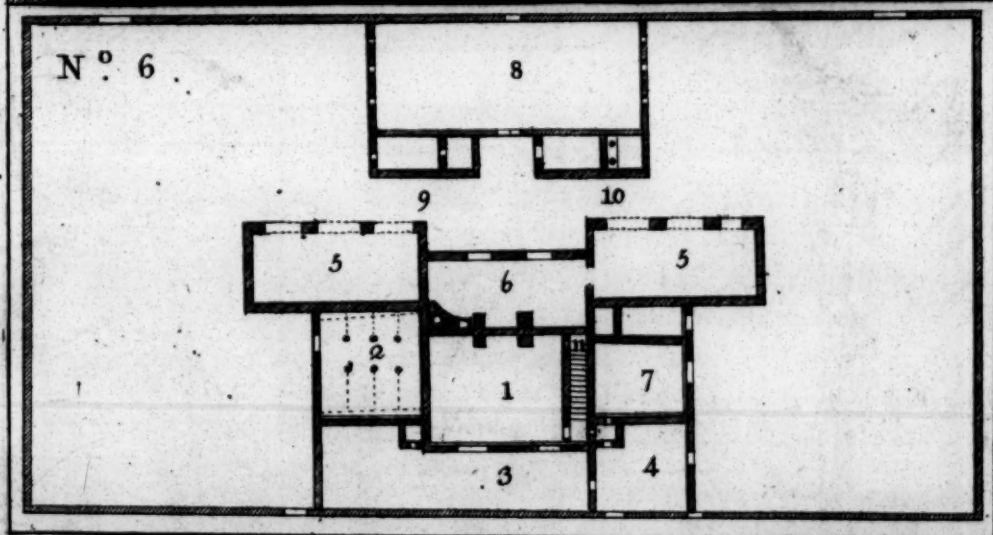
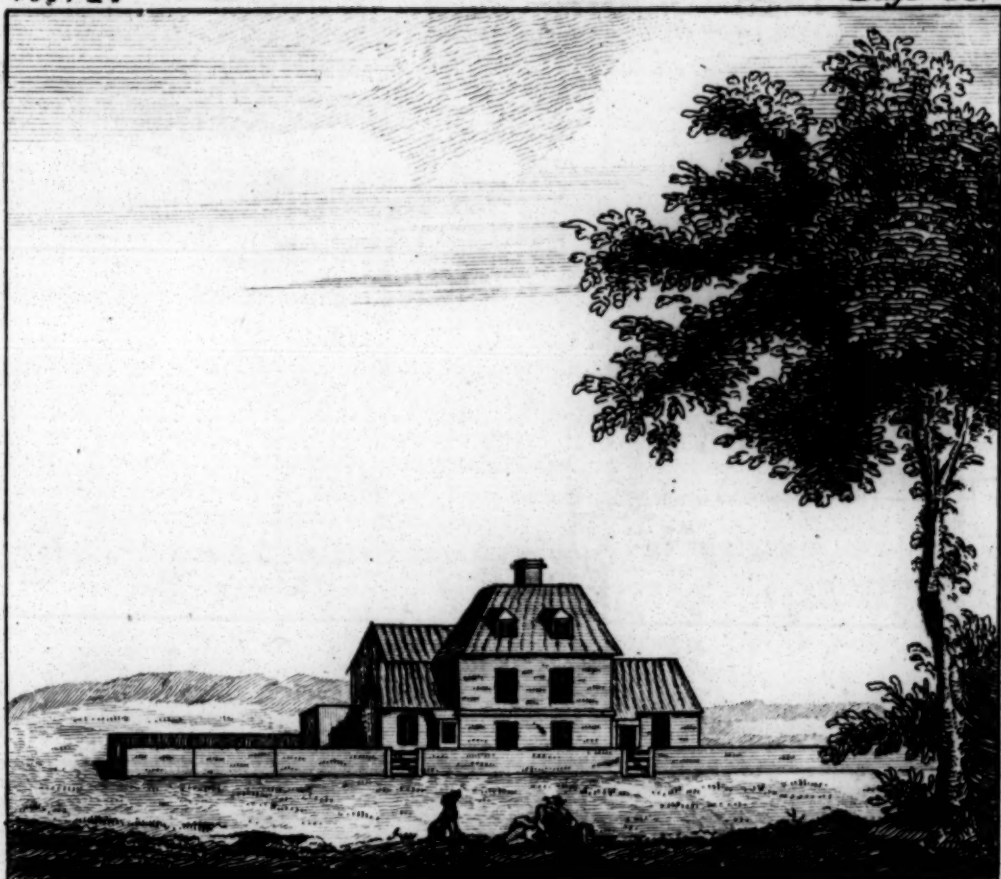
No. VI.

The Plan and Elevation of a Farm House of two Floors.

	REFERENCES.	See PLAN.	Feet	Feet
1 Parlour	—	—	20—	24
2 Stable	—	—	20—	20
3 Front Yard	—	—	50—	12
4 Poultry Yard	—	—	14—	12
5,5 Covered Shades	—	—	30—	12
6 Kitchen	—	—	30—	14
7 Bed Chamber	—	—	12—	12
8 Barn	—	—	50—	20
9 Hog House	—	—	20—	7
10 Poultry House	—	—	7—	12
11 Stair Case	—	—	20—	6

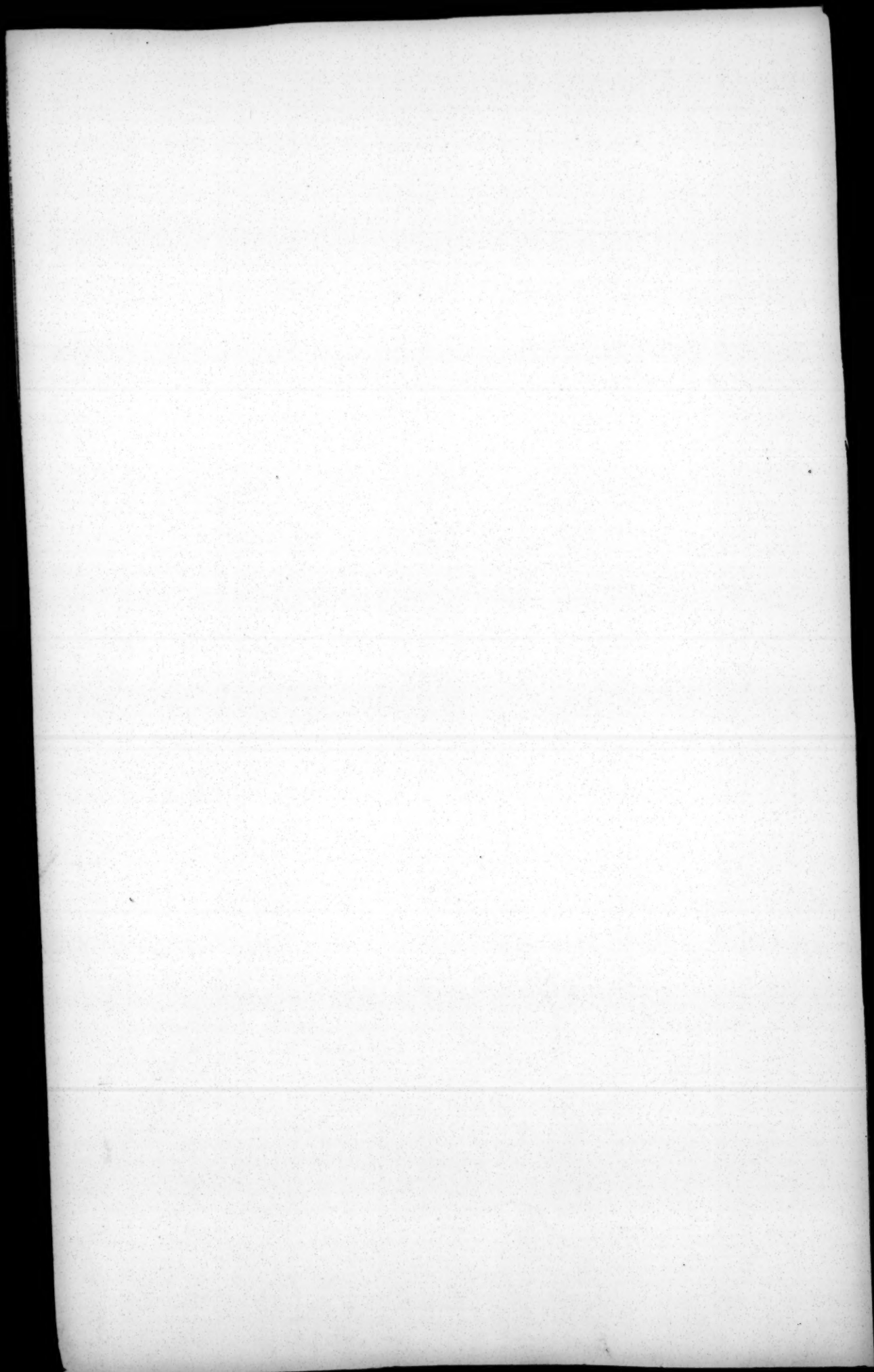
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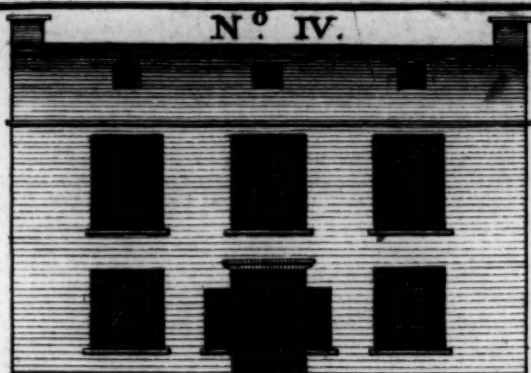




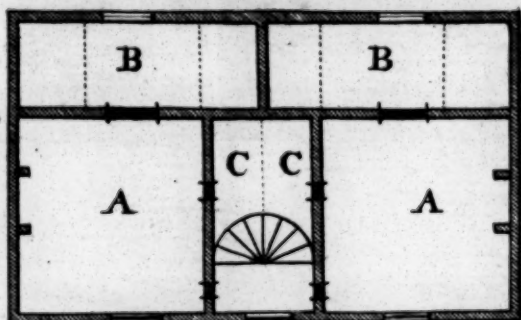
An Elevation and Plan of a Farm House. ^{Ridge So.}



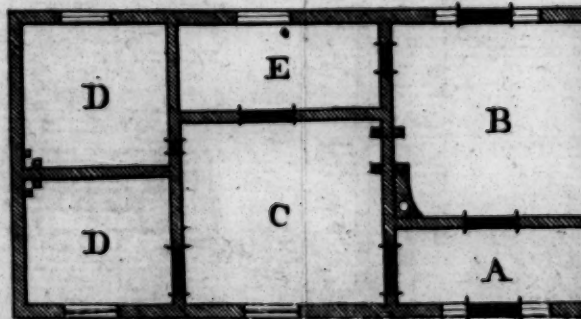
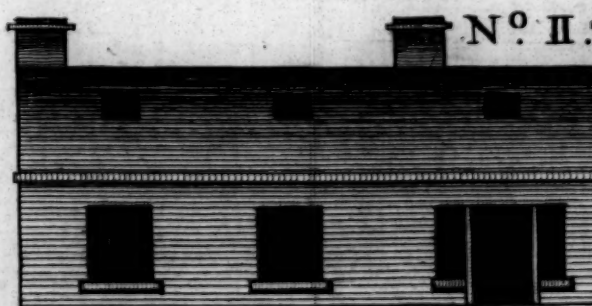
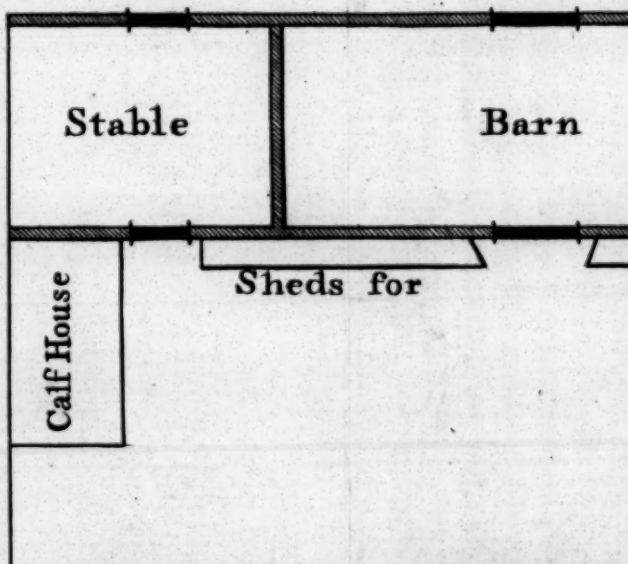
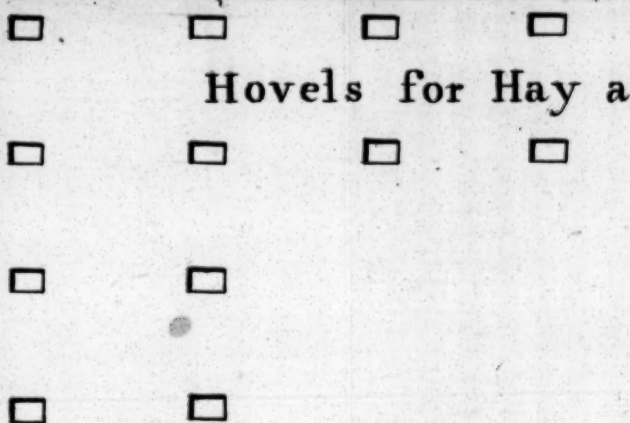
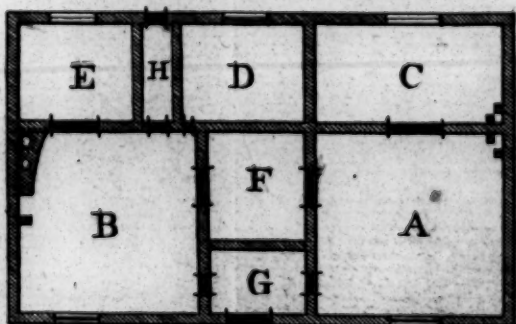
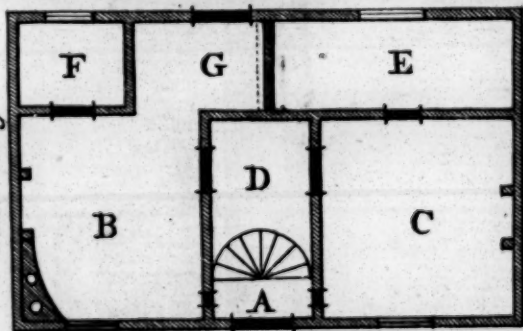


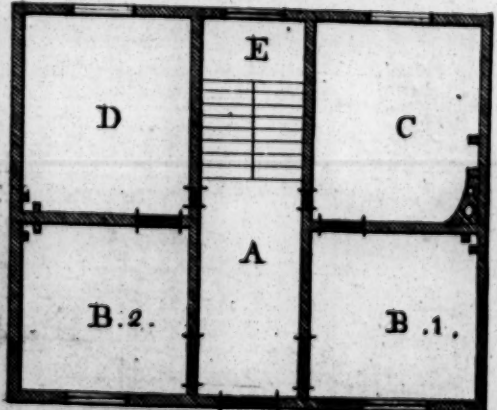
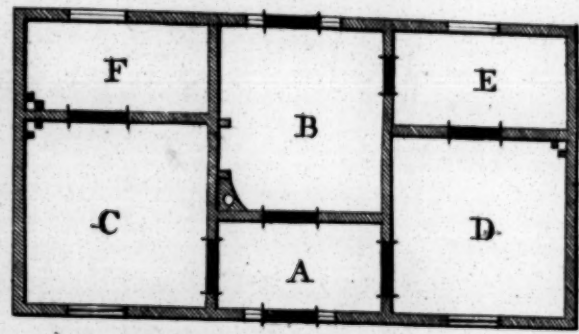
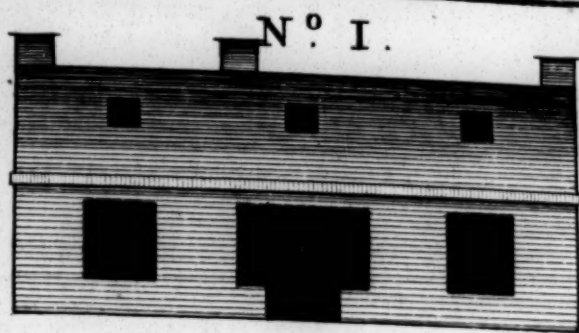
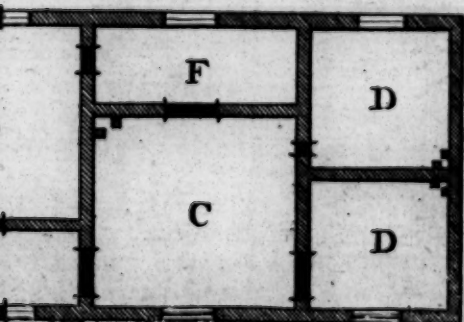
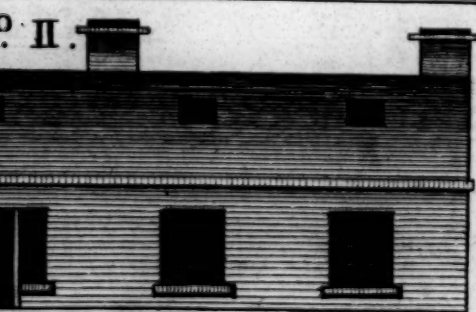
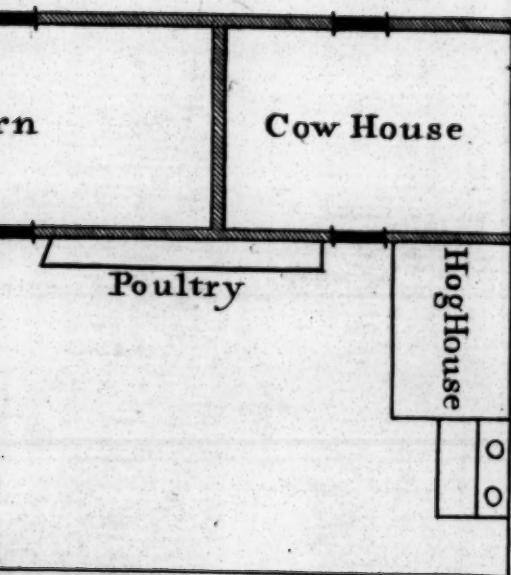
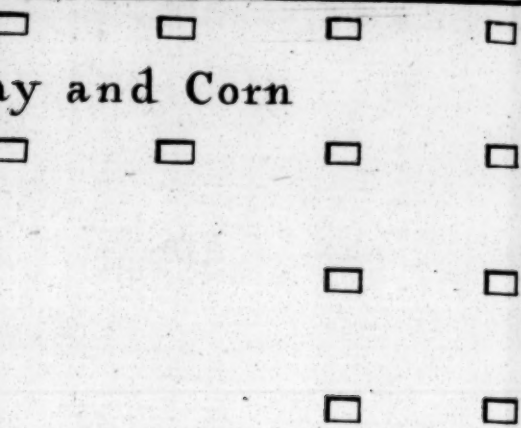


Second Story.



First Story.





First and Second Story.

